THE ROLE OF ORGANIZATIONAL CONTEXT IN THE IMPLEMENTATION OF MENTAL HEALTH SERVICES IN PEDIATRIC PRIMARY CARE: CONCEPTS, MECHANISMS, AND INTERVENTION

by
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ABSTRACT

Mental health is the most common concern that families bring to pediatric primary care providers (Blanchard, Gurka, & Blackman, 2006) and the leading cause of childhood disability (Halfon, Houtrow, Larson, & Newacheck, 2012) in the United States (Stein et al., 2015). While pediatric staff are in a unique position to coordinate mental health care (Coker, Thomas, & Chung, 2013), there has been little to no change in screening, diagnosis, and treatment practices over the past decade (Stein et al., 2015). This dissertation focuses on a factor that may play a key role in the successful implementation of mental health services in primary care: organizational context. While the concept is common to many implementation science frameworks, there is little consensus on how it is defined and measured through surveys in child health care. It is also unclear what aspects matter to mental health implementation in pediatrics; the mechanisms by which they support or hinder mental health promotion; and the efficacy of complex interventions addressing both individual and organizational determinants of practice change.

This mixed-methods research involved primary collection and analysis of data from the Ohio Building Mental Wellness Wave III Learning Collaborative, in which 29 pediatric primary care and family medicine practices were engaged to enhance mental health care delivery. Methods involved a systematic review of the organizational context literature and psychometric testing of a revised survey tool; in-depth qualitative interviews and statistical and qualitative configurative analysis of survey data to explore and test the role of organizational context in practice change; and quasi-experimental pre-post analysis of the effects of the complex intervention on implementation, service, and client outcomes.

Taken together, mixed-method findings demonstrate how facets of inner context, including *culture*, *structure/processes*, *climate* and *technologies*, and outer/fixed context, such as payer mix, co-location, and electronic medical record use, come together in unique ways to moderate the success of mental health service implementation. Findings provided initial evidence

that a complex intervention can bring about changes in clinician attitudes and confidence; mental health screening, diagnosis and prescribing patterns; and child mental health outcomes.

We conclude that organizational context is critical to successful mental health service implementation and provide practical recommendations for enhancing the organizational context of pediatric primary care to be more supportive of mental health. The "Pediatric Primary Care Office Inventory" survey will be further refined and made freely available to providers as a reliable/valid tool for assessing their organizational context for mental health and identifying strengths and areas for improvement.

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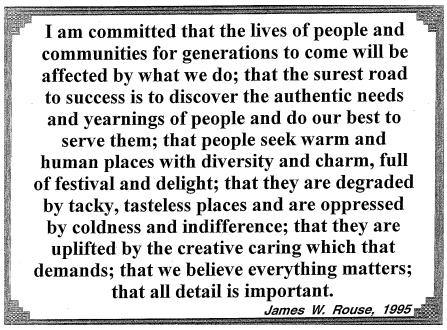

I feel very fortunate to have benefited from the wisdom and guidance of many mentors: my first boss, Scott Hartman, who inspired my love of health policy; Warren Hunt and the late Dr. Robert E. Wise of Lahey Clinic, whose visionary leadership and support of my research at a young age planted the seed for this dissertation topic; LBJ School professor Pat Wong, who taught me all I know about statistics and helped me overcome self-doubt; my MBHP supervisors Janice Harrington, Wayne Stelk, John Straus, and Gisela Morales-Barreto, whose e-mails to "go for the gold" are what carried me through the first difficult year; my PhD advisor Larry Wissow, a masterful teacher and compassionate physician; and my committee members and professors Olakunle Alonge, Elizabeth Colantuoni, Kate Fothergill, Deanna Kerrigan, Jill Marsteller, Jill Owczarzak, Erica Sibinga, Holly Wilcox, and Cui Yang. Without my having the honor to know and learn from each of you, there is no doubt in my mind that I never would have begun or completed this research. Thank you for your selflessness and example.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE: INTRODUCTION

"Culture eats strategy for lunch."

– Adam Bryant, *Quick and Nimble*

Background and Significance

If all youth had check-ups with primary care providers engaged in mental health care, the result would likely be communities where mental health is regarded as part of whole health, families feel better supported, and more youth transition into healthy adulthoods. Through the mechanism of the well child visit, pediatric primary care practices have an opportunity to address concerns and coordinate health and social services to help achieve these ends (Coker et al., 2013). Interventions for enhancing mental heath care capacity in primary care are needed, particularly in light of opportunities to test new models of care delivery that could be supported by payment reforms underway in many states (O'Donnell, Williams, & Kilbourne, 2013).

Mental health has been defined as "a state of successful performance of mental function, resulting in productive activities, fulfilling relationships with other people, and the ability to adapt to change and cope with adversity" (U.S. Department of Health and Human Services, 1999, p. 4). When this healthy state is out of balance, one is said to have a mental disorder, "characterized by alterations in thinking, mood, or behavior (or some combination thereof) associated with distress and/or impaired functioning" (p. 5). In the United States (U.S.), between 13 and 20 percent of children and adolescents are estimated to have diagnosable mental disorders (Centers for Disease Control and Prevention, 2013). An additional 20 percent are thought to have functional problems relating to behaviors or feelings that do not meet the threshold for diagnosis (Angold et al., 1999). Yet only about half of children with mental disorders have seen a mental health professional in the past year (Merikangas et al., 2010). Their health is jeopardized by outcomes of the mental disorders themselves, as well as by associated chronic diseases, which together contribute to these individuals living 25 years less than the general population (Parks at al., 2006). The cost of mental disorders among youth in the U.S. is estimated to be $247 billion per year (CDC, 2013), a figure that highlights the price of dependency upon "sick" as opposed to "well" care. By identifying and addressing warning signs during critical windows of growth and development,

primary care staff may help to disrupt the modes by which mental disorders are manifested (Institutes of Medicine, 2000), helping youth to achieve mental health (Forrest & Riley, 2004).

The Patient Protection and Affordable Care Act (ACA) (111th Congress, 2010) has created opportunities to pioneer and evaluate new models of health care delivery. Patient-centered medical homes (PCMHs), in particular, have facilitated evaluating frameworks for integrating mental health and primary care. Primary care homes are being designed to manage care and coordinate as needed with mental health providers, and for those with more serious mental disorders, behavioral health homes are being designed to manage care and coordinate as needed with primary care providers (Agency for Healthcare Research and Quality, 2012). Whether integration is best achieved through facilitated referral, in-house, or co-located services remains an open question (SAMSHA, 2012). Regardless, the goal of integrating mental health services into pediatric primary care appears efficacious. [1] Policymakers have recognized of the role of integration in the "triple aims" of improving population health, improving health care experiences, and reducing per capita health care costs (Laderman, 2015), and integration interventions and research on their effectiveness have proliferated (AHRQ, 2015; PCORI, 2015).

Pediatric primary care providers' philosophy of promoting and tracking child health and development complements the task of detecting emerging mental health issues and monitoring treatment outcomes. There is evidence that primary care providers can treat common disorders with good results (WHO, 2008). Further, they are in a unique position to help families overcome barriers to mental health care access. There are only about 8,000 practicing child and adolescent psychiatrists in the U.S. (AMA, 2014), and the mental health workforce is inequitably distributed (Thomas & Holzer, 2006; Thomas et al., 2009). For example, the ratio of child and adolescent psychiatrists to youth ranges from more than 20 per 100,000 in Massachusetts to less than 5 per 100,000 in Ohio, where the majority of counties have no child and adolescent psychiatrist

[1] Mental health services is defined here as patient engagement, screening, assessment, diagnosis, care planning, medical/non-medical treatment, and coordination of related health and social services.

(Holzer, 2013). Youth in rural settings have an especially difficult time accessing mental health care, as do minority groups such as black and Latino youth, who are half as likely as white youth to initiate care (Cook, Barry, & Busch, 2013). Primary care practices – like schools or community centers – are places that families visit regularly, making them natural points of access to care. Through trusting alliances, pediatric staff may engage youth in brief interventions; introduce them to mental health providers during or after visits; and create bridges to community health and social service providers. In doing so, they may play pivotal roles in not only facilitating access to mental health care, but also reducing stigma by treating mental health has part of whole health.

Despite pediatric staff being in a unique position to coordinate mental health services, the full potential of their role is under-realized (Coker et al., 2013). Many feel unprepared to identify, diagnose, or treat mental conditions (Boreman et al., 2007; Green at al., 2014). A symptom of this is that only 1 in 5 youth with mental health conditions are identified by their pediatricians, and only a fraction of these youth go on to receive treatment (Simonian, 2006). Results of a periodic survey conducted by the American Academy of Pediatrics (AAP) found little to no changes in these practices over the past decade (Stein et al., 2015).

A range of interventions to support integration of mental health and pediatric primary care have been developed, varying in complexity from telephone consultation and decision support systems (Sarvet et al., 2010), to collaborative consultation and care (Epstein et al, 2007; Kolko, Campo, Kelleher, & Cheng, 2010), to more fundamental transformation of care delivery using Systems of Care (SOC) (Stroul & Friedman, 1986) and Chronic Care Model (CCM) (Wagner, Austin, & Von Korff, 1996) approaches.[2] Adaptations of the CCM for this purpose

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[2] Core values of the **SOC** approach include family-driven and youth-guided, community-based, and culturally and linguistically competent (Stroul & Friedman, 1986). Elements of the **CCM** include "increasing providers' expertise and skill, educating and supporting patients, making care delivery more team-based and planned, and making better use of registry-based information systems" (see http://content.healthaffairs.org/cgi/content/full/28/1/75/DC1) (Coleman et al., 2009). The CCM is the organizing framework for most medical homes, including the **SAMHSA-HRSA (2012) model for the behavioral health home**, which has five core features: self-management support, delivery system design, decision support, clinical information systems, and community linkages. **Joint principles for integrating mental health care into PCMHs** include personal physician, physician-directed medical practice, whole person orientation,

have shown promise, including work to implement promising practices from mental health services that "fit" how care is delivered in pediatrics (Brown & Wissow, 2012; Wissow et al., 2008; Wissow et al., 2014). These include "common factors" or skills common across therapies that are relevant to all members of the care team (Lambert & Barley, 2001; Shirk & Karver, 2003); "common elements" or techniques common to treatments for major symptom clusters (Chorpita, Daleiden, & Weisz, 2005); and evidence-based treatment for specific conditions. The latter may be delivered in single sessions (Perkins & Scarlett, 2008) and "stepped" from general, low-burden treatments to those more specific in diagnosis and intensity (Richards, 2012).

With these newly developed interventions have come the questions of not only what are the "active ingredients" of an effective intervention, but also what are the factors that promote or hinder their implementation. Nationwide evaluations of medical home and chronic illness care projects have begun to identify factors driving transformation, ranging from engaged leadership and restructuring of practices into teams (Abrams et al., 2013) to cultures of quality improvement (McAllister et al., 2013) to positive perceptions of climate (Lin et al., 2005) to information technology systems that facilitate coordination and decision-making (Nutting et al., 2011). A systematic review of studies of the chronic care model in primary care settings, in particular, identified the following facilitators/barriers to implementation: "organizational culture, its structural characteristics, networks and communication, implementation climate and readiness, presence of supportive leadership, and provider attitudes and beliefs" (Kadu & Stolee, 2015, p. 11). I highlight these specific findings to illuminate what they hold in common: Each relates to some aspect of the organizational context of care delivery.

Inner organizational context is nominally defined in this research as an umbrella term encompassing *culture*, *structure/systems*, *climate*, and *technology*. This definition expands upon one put forth by Glisson (2002), who in his seminal work on the subject defined organizational

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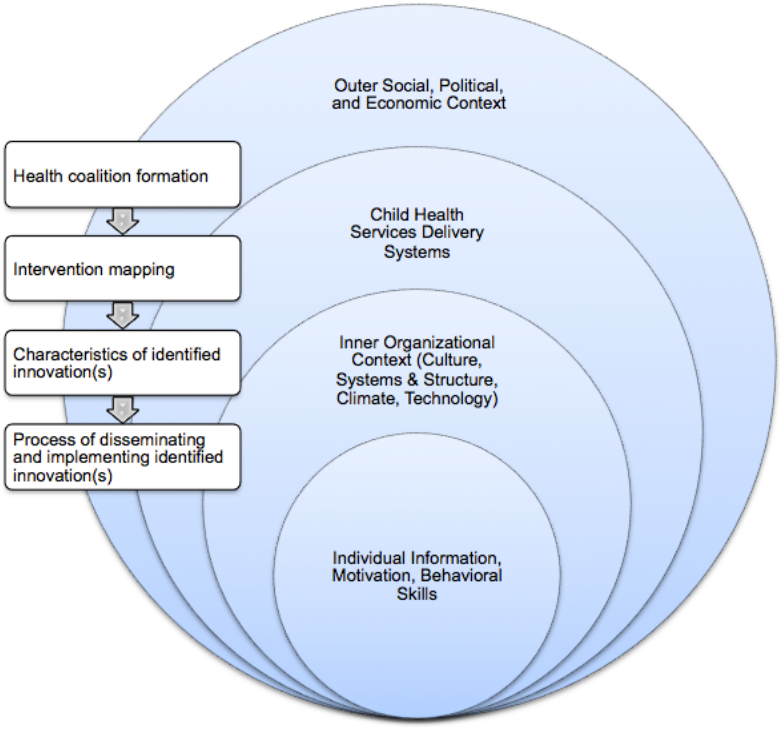
system-wide integration/coordination of care, quality and safety, access to resources, and payment models reflecting the value of mental health care (Baird et al., 2014).

context as a function of an organization's *culture*, *structure*, and *climate* that may be influenced by change agents and that affects the attitudes and behaviors of workers. Culture refers to shared behavioral expectations; structure refers to hierarchy and formalization of roles; and climate refers to how staff perceive work environment affecting their well-being. First, to emphasize that structure encompasses planned sequences of events in systems of care delivery, the word "systems" is appended to "structure." Second, *technology* is added to the umbrella. Glisson (2002) accepted context and technology as related concepts when he showed how context affects the adoption and implementation of technologies, which he defined as the "raw materials, knowledge, skills, and equipment that are used to create the product or provide the service for which the organization is funded" (p. 237). Technology could also be seen as a component of organizational context, insofar as existing "hard" technologies (e.g. clinical information systems) affect the adoption and implementation of new "soft" technologies (e.g. mental health care).

Outer organizational context is nominally defined as characteristics of the external environment in which practices operate. A systematic review of health sector studies found that *outer context* typically refers to "environmental variables, policy incentives and mandates, and interorganizational norms and networking" (Greenhalgh et al., 2004, p. 608) and Glisson (2002, p. 237) emphasized the affect of "interorganizational domains" on inner context. As illustrated in **Figure 1** (partially reproduced and adapted from Bartholomew, Parcel, & Gerjo, 1998), staff behaviors are influenced by inner context and the outer context of the health system and environment in which this system is situated. Interventions are in turn ideally "mapped" in response to community needs, taking into account how staff are constrained by context. *Fixed context* is defined here as factors that may affect implementation, but aren't directly targeted, often because they are externally determined.

Organizational context may be critical to successful implementation of mental health services in pediatric primary care insofar as it may promote or hinder implementation efforts and, if context changes over the course of an intervention, mediate service and client outcomes.

Figure 1.5: Inner and outer organizational context



"Hybrid" implementation-effectiveness designs have accommodated testing of implementation strategies (i.e. tactics to promote adoption or uptake of an intervention) alongside the effects of interventions (Curran et al., 2012). Such studies suggest that implementation varies by context, meaning baseline organizational context can be a predictor of whether interventions introduced into an organization are likely to be met with resistance (Hemmelgarn, Glisson, & James, 2006). In a range of health care settings outside of pediatric primary care, researchers have demonstrated an association between organizational context and positive staff attitudes, service outcomes, and client outcomes (Aarons et al., 2012; Alexander et al., 2005; Becker & Roblin, 2008; Glisson & Green, 2011; Glisson & Hemmelgarn, 1998; Glisson & James, 2002; Glisson & Schoenwald, 2005; Kaissi & Parchman, 2009; Morris, Bloom, & Kang, 2007; Rubin Stiffman et al., 2001; Shortell et al., 2004). Further, there is some evidence that changes in context brought about by public health interventions may serve to enhance these same factors (Abrams et al., 2013; Bloom & Farragher, 2013; Glisson et al., 2013; Schoenwald et al., 2008). Such studies

have elucidated the role of context as both a moderator and mediator of health outcomes. They show that rather than passively being controlled for statistically or manipulated as part of study design, organizational context may be actively framed as a target of health interventions.

At present, it is unknown what elements of organizational context are necessary or sufficient predictors of successful implementation of mental health services in pediatric primary care. The broad range of organizational context factors put forth in other fields as pertinent may belie the existence of a few essential elements that staff view as most relevant to their own experiences with mental health care delivery. Likewise, it is unclear what elements of organizational context affect service and client outcomes and through what mechanisms. The only tool we are aware of for assessing whether the context of pediatric primary care is supportive of integration, developed by the American Academy of Pediatrics (AAP, 2010), covers elements of systems/structures and technology, but few of culture and climate. Many general tools with good reliability and validity for measuring culture and climate in health and human service organizations exist, but their utility in the pediatric primary care setting is unknown.

The primary goal of this mixed-methods research was to promote a better understanding of the role of organizational context in pediatric primary care practice change. Because achieving this goal required measuring "organizational context," the first step was to review the literature and contribute to the development of a preliminary revised "Pediatric Primary Care Office Inventory" tool that pediatric staff could use to assess their organizational context for mental health care delivery and identify strengths and areas for improvement. We looked to Ohio Building Mental Wellness Wave III, an intervention to support implementation of mental health services in pediatric primary care, as a source of data for achieving this goal. A "hybrid" implementation-effectiveness design enabled us to study the role of organizational context in program implementation while at the same time evaluating the effectiveness of the intervention.

Research Aims and Objectives

Aim 1: Concept Explication: Describe rationale for development of an instrument to measure organizational context as it relates to mental health service implementation in pediatric primary care and test psychometric properties of an initial survey tool.

> **Objective 1:** Explicate, through a systematic review of the literature, how the concept of organizational context is defined and operationalized in health care service settings and which facets have been associated with organization change (where change is defined as implementation outcomes and its effectiveness measured by service and client outcomes).
>
> **Objective 2:** Test the psychometric properties of an initial survey tool with four hypothesized inner context domains: culture, climate, systems/structure, and technology.

Aim 2 – Mechanisms of Change: Explore and test what aspects of organizational context are associated with pediatric primary care practice change and the ways in which organizational context acts as a facilitator or barrier to change in pediatric primary care practices in Ohio.

> **Objective 1:** Explore, using in-depth semi-structured qualitative interviews, how pediatric primary care staff conceptualize organizational context as a facilitator of and/or barrier to change (including what aspects of organizational context changes during the initiative and how these changes supported implementation of mental health services).
>
> **Objective 2:** Test, through analysis of survey data, whether aspects of outer/fixed organizational context (payer mix, health system affiliation, medical home and accountable care organization status, urban/suburban/rural, weekly patient volume, co-located mental health specialists, prior QI experience, use of electronic medical records) and baseline inner organizational context moderate implementation outcomes.
>
> **Objective 3:** Use qualitative comparative analysis to illuminate combinations of outer/fixed context characteristics (payer mix, health system affiliation, medical home

and accountable care organization status, urban/suburban/rural, weekly patient volume, co-located specialists, prior QI experience, electronic medical records) that are necessary or sufficient for BMW participants to be "leading" or "lagging" in implementation.

Aim 3 – Intervention Effects: Test, through analysis of survey and Medicaid claims data, whether the complex Ohio BMW Wave III Learning Collaborative intervention supported mental health service implementation among participating pediatric primary care practices.

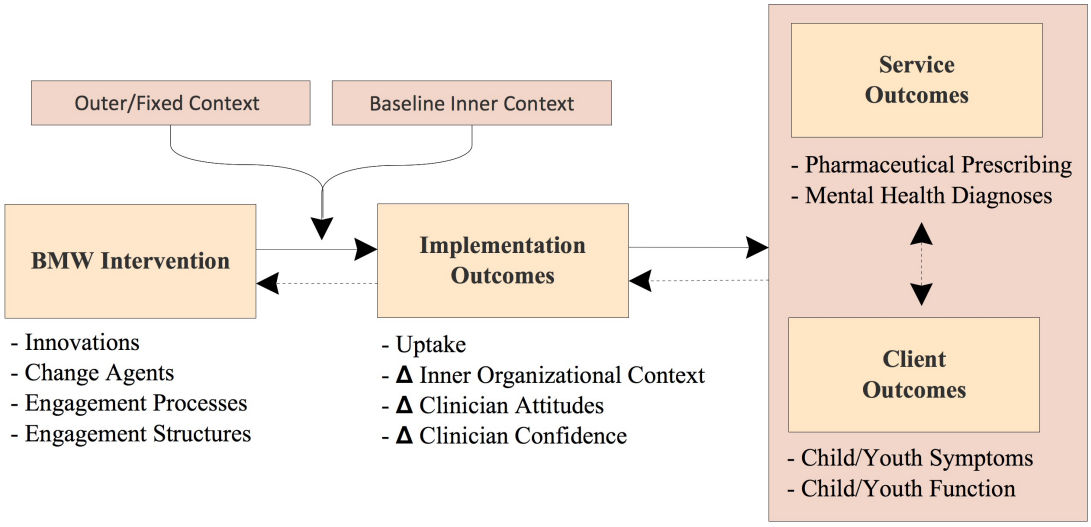
Conceptual Model

Proctor et al. (2009, 2011) put forth a conceptual model for implementation research that, modified to reflect ideas proposed by Owczarzak, Filippova, & Phillips (2014) and the National Coalition for Dialogue & Deliberation (2005), form the skeleton framework into which the conceptual model for my dissertation research on organizational context is nested (**Figure 1.2**).

The research aims outlined on the prior pages are situated in the setting of the BMW pediatric primary care practice change intervention to support a mixed-method approach to understanding the role of organizational context: How do pediatric primary care and family medicine staff perceive organizational context as shaping their experiences with engaging in a Learning Collaborative and taking on new mental health care tasks? Is a complex intervention that addresses individual- and organization-level determinants effective in bringing about practice change? What are the mechanisms by which context might support or hinder this change?

Layer 1: Practice Change Intervention: A practice change intervention is undertaken. BMW targets both individual- and organization-level change, including attitudes toward psychosocial elements of care; confidence using "common factors" communication skills and "common elements" for low mood; and inner context (*culture*, *structure/processes*, *climate*, *technology*). The extent to which practices engage in program activities is gauged through measures of uptake.

Figure 1.2: Conceptual model



Layer 2: Moderators: Baseline inner and outer/fixed organizational context are hypothesized to moderate implementation outcomes. Inner organizational context is hypothesized to encompass four domains: culture, systems/structure, climate, technology. Aspects of outer/fixed context measured include payer mix, health system affiliation, medical home and accountable care organization status, urban/suburban/rural, weekly patient volume, co-located mental health specialists, prior QI experience, and use of electronic medical records.

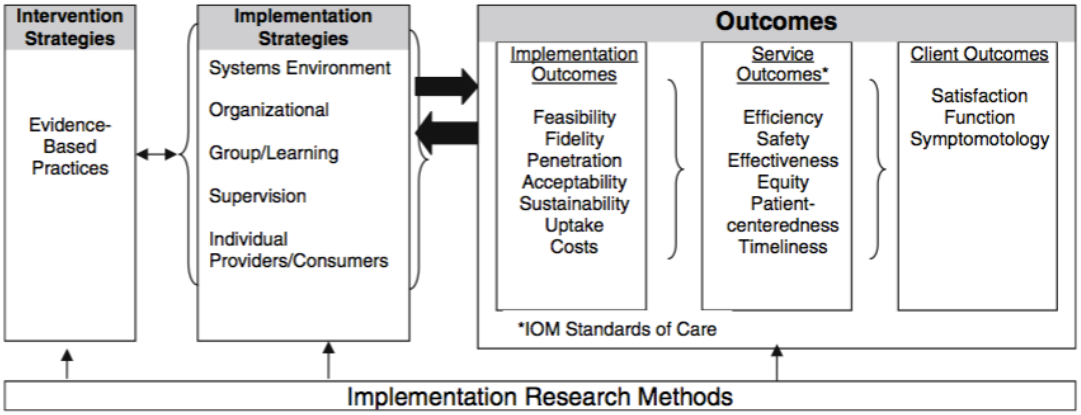
Layer 3: Implementation Outcomes: Implementation of the BMW intervention is measured as a function of changes in inner organizational context; uptake; and changes in clinician confidence and attitudes. These implementation outcomes are hypothesized to mediate the relationship between BMW and service/client outcomes, a relationship that is informed by theories of behavior change including the IMB model (Fischer & Fischer, 1992) and the unified theory of Guilamo-Ramos et al. (2008). May (2013) submits that innovations are embedded through social mechanisms that are shaped by organizational context. This context affects whether an innovation is adopted, and if implemented, whether it is modified to fit the organization or vice-versa

(Glisson, 2002). Since the reciprocal effect of organizational context on the BMW intervention is not being tested, the relationship is represented by a dotted arrow.

Layer 4: Service and Client Outcomes: Changes in inner organizational context are hypothesized to support service outcomes (evidence-informed diagnosis and prescribing) and client outcomes (child/youth symptoms and function) (solid arrow). As staff are rewarded through more positive and productive interactions with clients, implementation outcomes such as attitudes and climate are reciprocally reinforced (dotted arrow). A dotted arrow within this layer shows service outcomes mediating client outcomes and how, as staff witness positive outcomes of their own clients and those of others, their mental health care behaviors are reinforced through social learning (Bandura, 1975, 1986). While the pathways in this layer were not tested quantitatively due to low sample size, we explored these relationships as they were perceived by primary care staff through in-depth qualitative interviews.

The framework for this conceptual model was adapted from a combination of earlier works. Proctor et al. (2009, 2011) identify three categories of outcomes (implementation, service and client) and two strategies for bringing them about (intervention and implementation). Their model (**Figure 1.3**) simplifies the task of measuring and evaluating the outcomes of behavioral interventions by distilling these outcomes and strategies from frameworks put forth in diverse disciplines. Intervention strategies are synonymous with public health “innovations” in the context of Rogers' (2003) seminal work, whereas implementation strategies encompass levels (e.g. organization), processes (e.g. learning), and participants (e.g. providers) by which or through whom an intervention is implemented. In practice, defining the multifaceted BMW intervention in terms of combinations of these two types of strategies proved quite difficult.

Figure 1.3: Conceptual model for implementation research (repr. from Proctor et al., 2009)



To arrive upon a working definition of an intervention, I next looked to the work of Owczarzak, Filippova, & Phillips (2014), who in their model for HIV prevention intervention implementation defined a behavioral intervention as a unique combination of implementation, content, and pedagogy (**Figure 1.4**). An exercise in applying this framework to BMW revealed that these categories, too, could be expanded upon. For example, pedagogy is just one means of engaging individuals in a process of co-learning and change. I therefore took a few steps back to really consider what BMW ultimately involves: a process of active engagement across multiple system levels and change agents. It occurred to me that this maps well to the Engagement Streams Framework put forth by the National Coalition for Dialogue and Deliberation (2005) (www.ncdd.org). The NCDD outlines diverse "streams" of engagement that can facilitate this type of process, as well as engagement methods, which are dependent upon a group's purpose and are unique in terms of size, form, and participants. While actually a much older framework developed by Wilson (2004) and others in the field of public engagement and conflict resolution, it helped to facilitate further expansion of the unique domains of a practice change intervention.

Figure 1.4: Domains common to behavior interventions (repr. from Owczarzak et al, 2014)

Implementation	Content	Pedagogy
Multi-session	HIV/AIDS information	Peer group discussion or interaction
Small group format	Risk Identification and Skill-building to address risk	Demonstration, modeling, role-playing
Knowledgeable, skilled facilitators	Create supportive environment	Tailored, culturally relevant information

Synthesizing the theories of Proctor, Owczarzak, and Wilson, I arrived upon a skeleton framework for my conceptual model in which interventions are defined as unique combinations of **innovations** (e.g. "common factors"); **change agents** (e.g. pediatric practice staff); **engagement processes** (e.g. role-plays); and **engagement structures** (e.g. site visits). These interventions in turn bring about **implementation outcomes** (e.g. uptake), **service outcomes** (e.g. family-centeredness), and **client outcomes** (e.g. symptoms and function).

Crosswalk of Conceptual Model and Intervention

Ohio Building Mental Wellness (BMW) Wave III was a statewide learning collaborative coordinated by the American Academy of Pediatrics (AAP), Ohio Chapter. The goal was to support pediatric primary care staff in implementing mental health services, achieving coordinated and family-centered care, and promoting positive child/youth health outcomes. Twenty-nine hospital-, school-, and other community-based pediatric primary care providers engaged in the multifaceted intervention from October 2013 through June 2015. Each participated in a package of activities to bring about change through three key drivers or **innovations**:

1. **Skills, attitudes, and confidence** to support promotion, early identification, and management of mental health concerns;

2. **Culture, climate, structures/processes, and technologies** that support delivery of mental health services; and

3. **Integrated models of mental health services** involving community linkages and decision support.

The Chronic Care Model (Wagner et al., 1996) and SAMHSA-HRSA (2012) model for the behavioral health home served as the organizing framework for the structures/processes, technologies, and integrated models. The AAP core competencies (Committee on Psychosocial Aspects of Child and Family Health, 2009) and (Brown & Wissow, 2012; Wissow et al., 2008; Wissow et al., 2014) application of the "common factors" and "common elements" for pediatric primary care served as the organizing framework for the skills taught. Culture and climate were addressed through multiple activities aimed at bringing clinical and non-clinical staff together for co-learning, dialogue, and planning. **Change agents** involved included pediatric staff, the BMW training team, and the CMHSPPC team. Corresponding **engagement processes** and **engagement structures** included:

- Intergroup dialogue and inquiry to develop practice "**aim statements**" and "**story boards**" through pre-work conference calls and in-house meetings;

- Lectures, intergroup dialogue, role-plays, and resource exchange through one of three regional all-day **Learning Sessions**;

- Lectures, intergroup dialogue, role-plays, evaluation, and feedback through a series of four 2- to 3-hour **on-site trainings** designed to prepare the office and teach communication ("common factors") and brief intervention ("common elements") skills

- Breakthrough Series of "Plan, Do, Study, Act" cycles facilitated through in-house meetings and monthly **action period calls** with the BMW training team (IHI, 2003);

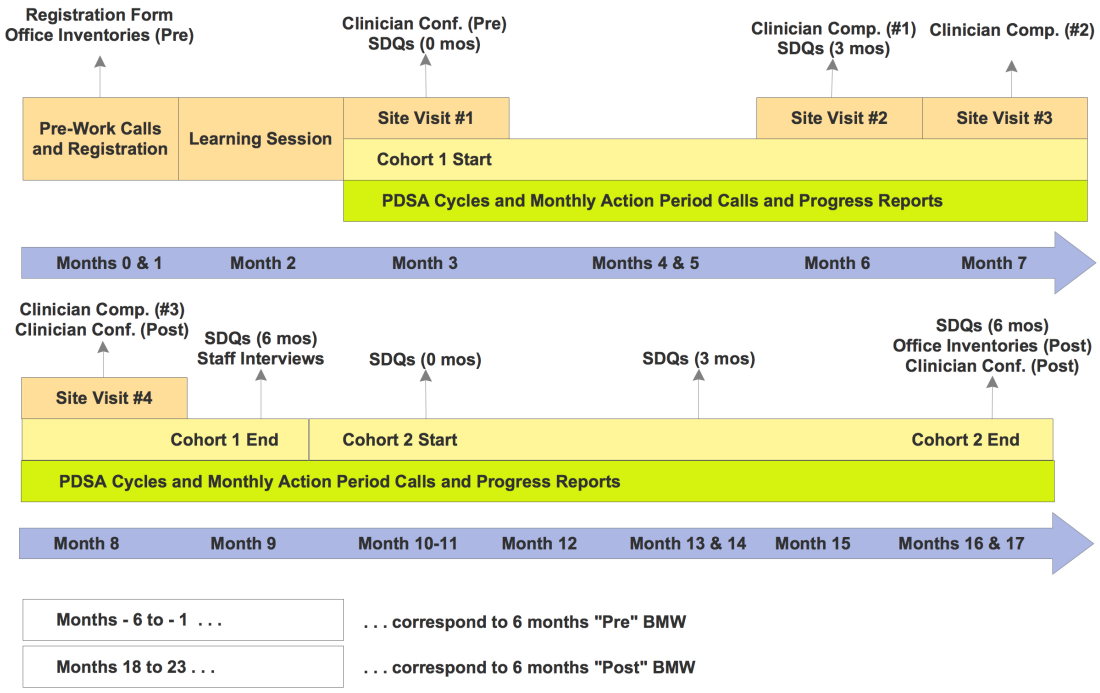
- Meet and greets, relationship-building, co-creation of mental health resource directories and memoranda through **community partner receptions** and telephone calls; and

- Teaching and intergroup dialogue through **online learning communities** and **webinars**.

Here, we consider how a hypothetical practice would move through BMW and the points at which (a) quantitative survey data are collected to measure outcomes, and (b) qualitative interview data are collected to support our aims of exploring mechanisms of change and

illuminating practice typologies. This flow is illustrated below in **Figure 1.5** and a crosswalk of surveys to associated implementation, service, and client outcomes is presented in **Table 1.1**.

Figure 1.5: Progression of a practice through the BMW Wave III Learning Collaborative



The AAP undertook statewide recruitment and conducted pre-work conference calls with practices expressing interest in BMW Wave III beginning in October 2013. Twenty-nine practices elected to participate and designated a practice lead to complete a **registration form** inclusive of elements of outer/fixed organizational context. Eleven of the 29 practices were school-based health centers from a single metropolitan area who reported their data collectively under one of three groups: preschool to 6th grade, preschool to 8th/12th grade, and high school only. This had implications for analysis, which with the exception of measures of program uptake, was conducted on 21 practice clusters.

Practices were asked to join one of three groups, each undertaking the same activities, but beginning a few months apart to allow the implementation team to dedicate adequate time to each

practice. They began by participating in one of three regional all-day Learning Sessions, followed by a series of four on-site mental health communication and skills trainings. While Learning Sessions were attended only by a small representative group of staff, the first on-site training was designed for staff in all roles, and all staff were invited to attend the other trainings as well. At each of these site visits, there was a 45- to 60-minute academic detailing session and opportunities for coaching to help translate new knowledge and skills into practice. All staff were asked to complete the (pre) **Office Inventory** (AAP, 2010; King, 2016a) inclusive of questions about inner organizational context and attitudes toward psychosocial aspects of care, prior to the first visit. This was completed online and was anonymous, save for identification of the practice to which the staff member belongs. Only those self-reporting as clinicians (i.e. physicians, physician assistants, nurse practitioners, and other clinical staff) were administered the version with questions about clinician attitudes and office technologies, which were specific to screening, diagnosis, and treatment of mental health conditions. Research staff shared blinded benchmarking reports with practice leads, highlighting relative strengths and areas for improvement, to help leads guide staff in choosing aims for Plan, Do, Study, Act (PDSA) cycles. All participants were given access to **11 online learning modules**, including one on psychotropic medication prescribing, which could be completed at any point during the Learning Collaborative.

Children/youth ages 4 to 17 presenting for a well child visit during the month coinciding with the practice's first site visit were screened for participation in **Cohort 1** using the parent version of the Strengths and Difficulties Questionnaire (SDQ) (Goodman, 1997). Children/youth with a total difficulties score of 17 or above and a non-zero function score were eligible to participate. If the parent/caregiver agreed, the child/youth was enrolled and the SDQ was re-administered in 3 and 6 months. Screening continued until a practice achieved a cohort of 15 patients. SDQ data was available to the child/youth's clinician to support patient care and QI.

At the first site visit, which addressed engagement and screening, clinical staff completed a (pre) **Clinician Confidence Measure** relating to skills covered in the training. The remaining

three site visits, which addressed other "common factors" skills and "practice elements," took place over the next six months. These were interspersed with three PDSA cycles and monthly action period calls that continued through the end of the Learning Collaborative. Practice staff completed **Monthly Progress Reports** of their progress and overall uptake of BMW. At visits two through four, each clinician took part in a role-play with a BMW staff member, who completed a competence assessment of the clinician's ability to demonstrate common factors skills and practice elements for low mood. This assessment was informally conducted to help solidify behavioral skills as opposed to quantify or measure competence. At the final site visit, clinicians completed the (post) **Clinician Confidence Measure**.

The month following the fourth (final) site visit, practices recruited **Cohort 2** and qualitative interviews were conducted with staff. When Cohort 2 was complete six months later, staff complete the (post) **Office Inventory** and a second (post) **Clinician Confidence Measure**. At last, Medicaid/OCHIP claims data for diagnosis and prescribing were collected for each BMW-enrolled clinician in the six months "pre-" and "post-intervention," with actual dates corrected to coincide with the months before and after his/her group's participation. Because BMW was an 18-month program, for each of the three groups, the same six months (seasons) were represented in the "pre" and "post" period. The start of the "pre" period for the first group was May 2013 and the start of the "post" period for the third group was March 2015; at this point all site visits and the vast majority of PDSA cycles and online modules had been completed. The deidentified claims data were obtained from the Ohio Colleges of Medicine Government Resource Center (GRC) based on a specification submitted by the author (**Appendix A**).

Table 1.1: Crosswalk of surveys to implementation, service, and client outcomes

	Implementation Outcomes	Service Outcomes	Client Outcomes
Registration Form	**Outer/Fixed Context:** payer mix, health system affiliation, PCMH and ACO status, number of clinical and non-clinical staff, location, weekly patient volume, on-site specialists		
Office Inventory	**Inner Context:** office systems and structures, office technologies, office culture, office climate **Attitudes:** Physician Belief Scale (Ashworth, Williamson, & Montano, 1984)		
Clinician Confidence Form	**Confidence:** clinician self-rating of confidence using common factors skills and practice elements for major symptom clusters		
Strengths and Difficulties Questionnaire (SDQ)			**Symptoms** (difficulties) and **Function** (impact)
Medicaid Claims		**Mental Health Diagnoses:** Rates of mental health diagnoses among Medicaid-enrolled clients **Psychopharmaceutical Prescribing:** Rates of prescribing among Medicaid-enrolled clients	
Monthly Progress Report	**Uptake:** Assessment Scale for Collaboratives (IHI, 2004) and BMW Star Recognition System		

Protection of Human Subjects

General ethical principles for human subjects research as put forth in the Belmont Report (National Commission for the Protection of Human Subjects, 1979) were considered in the design of BMW and associated research. *Respect for persons* was applied through informed consent procedures; *beneficence* was applied through determination of a favorable risk/benefit ratio and

inclusion of procedures for study withdrawal and reporting of adverse events; and *justice* was applied through methods undertaken to promote equal opportunity of participation across staff roles and to ensure providers understand both the benefits and burdens involved in participation.

Parent Study and Reliance Agreement: The parent study came about as a collaboration between the American Academy of Pediatrics (AAP), Ohio Chapter, and the Center for Mental Health Services in Pediatric Primary Care at Johns Hopkins Bloomberg School of Public Health (JHBSPH). The collaboration centers on the Ohio BMW Wave III Learning Collaborative. Ohio BMW is itself a quality improvement project, but components of its evaluation have been approved as human subjects research by the Nationwide Children's Hospital (NCH) IRB (FWA00002860). The author is approved as an investigator on this research project (IRB13-00397), led by PI Rebecca Baum, MD. An authorization agreement was sought by the author and signed by the NCH and JHBSPH IRBs agreeing that the JHBSPH IRB may rely upon the NCH IRB for review and oversight of her participation in this research.

Consent Process and Documentation: Waiver of signed consent was requested and granted for: (a) staff participation in the Practitioner Competence and Practitioner Confidence assessments; (b) staff completion of the Office Inventory; and (c) parent/caregiver completion of the SDQ (SharePoint). Completion of forms was considered consent to participate, and cohort enrollees were given an information sheet. A separate consent process was developed for staff who expressed interest in a qualitative interview. Before the start of each interview, the author provided a copy of the Statement to Interview Participants (**Appendix B**), asked if the person had any questions, and if (s)he remained interested, solicited consent. If the person agreed to recording, the author asked to start the recorder and begin the interview. If the interview was conducted by telephone, it was recorded directly to a digital recorder using an Olympus TP8 Telephone Pickup Microphone. If the person did not agree to recording, the author confirmed that

she would take only written notes before asking to begin the interview. A written record of consents was kept, and in this record, only study IDs (no names) were recorded.

Collection of Identifiers: BMW staff collected identifiers from pediatric practice staff that were used solely for site enrollment, communications relating to quality improvement and evaluation components of the Collaborative, and continuing education credit processing. When data were to be analyzed for research purposes, all data elements were de-identified and given study ID numbers. Data sets used in analysis contain no identifying information. De-identified data for measuring service outcomes were obtained from Ohio Colleges of Medicine Government Resource Center. Security for this data involved housing all data on a secure server mapped directly to and accessed only by analysts within the Child Policy Research Center at Cincinnati Children's Hospital. Permission to access data was restricted to BMW study investigators. For the SDQ, patient data (name, date of birth) and caregiver data (name, e-mail address, and responses) were housed on a SharePoint site that was accessible to pediatric staff only. When data were transferred to an analytic database, identifying information was removed and replaced with a study number. Because BMW staff did not have access to private health information, there were no Health Insurance Portability and Accountability Act concerns.

Risks: Risks for clinical staff included potential stress from role-plays with BMW staff. This risk was estimated to be minimal. Risks for non-clinical staff included consideration of their attitudes and perceptions regarding the provision of mental health care. This risk was also expected to be minimal. For all staff, there was the risk that opinions expressed on survey instruments or in interviews could be construed as reflecting poorly on their clinical skills or as being critical of colleagues or management. To reduce these risks, practitioner assessments were conducted in a private, supportive learning environment, which minimized potential stress. Information from qualitative interviews and Office Inventories was only shared in aggregate. Risks for parents/caregivers include contemplation of their child's health concerns. This risk was expected

to be minimal. Other risks included breach of confidentiality regarding a child's problems. To reduce these risks, information collected from parents/caregivers was kept to the minimum amount necessary to fulfill the aims of the Learning Collaborative.

Benefits: Benefits to pediatric primary care staff included gaining new knowledge regarding the care for children with emotional, developmental, and behavioral problems. This is a particular deficiency for many primary care practitioners. Practice leads received customized Office Inventory reports that described, in aggregate, attitudes toward and organizational context for provision of mental health care at the start and end of the Learning Collaborative. This information was used by practice leaders to identify strengths and areas for improvement and to assess progress toward related goals. Clinicians and parents/caregivers of children/youth in SDQ cohorts had the benefit of screening and monitoring of the child's/youth's progress.

Payment: Practices each received $450 for their participation, and use of this payment was at their discretion. Parents/caregivers who completed the SDQ received $5 per follow-up questionnaire for a total of $10. Staff who participate in a qualitative interview received a $25 Target gift card to compensate them for their time.

Safety Monitoring and Reporting of Unanticipated Problems / Adverse Events: The BMW and CMHSPPC teams had regular meetings to discuss the project; concerns about unanticipated problems or adverse events will be immediately discussed and remedied. The author participated in human subjects training and was alert to problems and adverse events, especially those related to data security. If any problems had arisen over the course of this research, which they did not, we would have immediately discussed, documented, and reported them to both IRBs.

Research Design and Dissertation Organization

BMW is itself is a quality improvement project, but components of its evaluation have been approved as human subjects research and form the basis for this dissertation research. A convergent mixed-methods design was chosen that places equal value on the qualitative and quantitative forms of inquiry that are both crucial to achieving our research aims (Creswell & Clark, 2010). These methods include a concept explication (Aim 1), in-depth semi-structured qualitative interviews (Aim 2), and quasi-experimental pre-post analysis of survey data and qualitative comparative analysis (Aims 2 and 3). This design is at once inductive and theory-*building* (corresponding methods: concept explication, exploratory elements of qualitative interviews, qualitative comparative analysis) and deductive and theory-*testing* (corresponding methods: structured elements of qualitative interviews and analysis of survey data). Just as interview narrative and concept explication complement survey data (e.g. allowing us to explore *why* an aspect of organizational context might be significant or *how* it might influence outcomes), so too do they expand upon the range of content considered in our inquiry (e.g. helping us to identify important aspects of organizational context not considered *a priori*). In merging content from interviews, surveys, and Boolean analysis in the process of drawing conclusions and making recommendations, we also cross-validate themes arising from each form of inquiry.

This dissertation is organized into six chapters and includes four manuscripts:

Chapter 1 (Introduction)

The first chapter provides background on the epidemiological importance of addressing mental health in the context of pediatric primary care and the rationale for research on the role of organizational context in mental health service implementation. This chapter also outlines the aims and objectives of this dissertation; a conceptual model; the components of the Ohio BMW Wave III intervention; and protection of human subjects.

Chapter 2 (Manuscript 1)

The first manuscript presents a systematic review of how "organizational context" is defined and measured in the pediatric primary care literature and the development of a preliminary revised version of the AAP Mental Health Practice Readiness Inventory (2010). The preliminary "Office Inventory" tool developed was administered to all staff in practices participating in BMW Wave III. This manuscript demonstrates that this preliminary tool, used in testing the hypotheses set forth in other research aims, is an adequately reliable and valid measure of the organizational context for mental health service implementation in pediatric primary care.

Chapter 3 (Manuscript 2)

The second manuscript presents findings of a series of semi-structured in-depth interviews with 24 BMW Wave III participants from a cross-section of clinical and non-clinical roles. These interviews explore how pediatric primary care staff perceive inner organizational context as shaping their experiences with engaging in a Learning Collaborative and taking on new mental health care tasks. We outline what aspects of "inner context" staff saw as making implementation possible or difficult at their practices, as well as what aspects of inner context changed during BMW and how these changes supported or hindered individual application of new knowledge and skills. Findings provided the "why" and "how" necessary for interpreting the intervention effects measured in Manuscript 3 and moderating effects measured in Manuscript 4. They also broadened our search for elements of context to be included in the Pediatric Primary Care Office Inventory survey beyond what was found in the systematic review.

Chapter 4 (Manuscript 3)

The third manuscript represents the second of two papers whose aims are theory-testing. Its focus is the effects of the Ohio BMW Wave III Learning Collaborative on clinician confidence, clinician attitudes, and organizational context for mental health services (*implementation outcomes*); mental health service delivery, diagnosis, and prescribing patterns

(*service outcomes*); and improvements in symptoms and function for children/youth with actionable mental health concerns (*client outcomes*). The in-depth interviews conducted as part of our second research aim are drawn upon in discussing findings. In addition to serving as a quasi-experimental evaluation of the efficacy of the intervention, this paper lays the foundation for Manuscript 4. Moderation analyses were only possible insofar as the intervention had a measurable effect on outcomes and there was considerable between-practice variability in perceptions of organizational context.

Chapter 5 (Manuscript 4)

The fourth manuscript represents the second of two papers whose aims are theory-testing. Here, we present findings of linear mixed-effects regression models testing the moderating effects of organizational context on changes in attitudes, change in confidence, and uptake. We also assess the correlation between baseline context and changes in context over time. Quantitative analysis is complemented by qualitative comparative analysis, used to search for combinations of outer/fixed context variables that are necessary or sufficient for uptake, thus providing greater depth to statistical findings. Manuscript 3 and follow-ups with interview participants are drawn upon in the discussion to make sense of findings and to suggest recommendations for creating an inner organizational context that is more supportive of mental health.

Chapter 6 (Discussion)

The final chapter provides a summary of findings for each research aims and objectives. This is followed by a detailed discussion of the limitations and strengths, research implications, and policy and program implications.

CHAPTER TWO: MANUSCRIPT ONE

Care in Context: An Inventory to Assess Organizational Readiness for Mental Health Service Implementation in Pediatric Primary Care

"I am committed that the lives of people and communities for generations to come will be affected by what we do; that the surest road to success is to discover the authentic needs and yearnings of people and do our best to serve them; that people seek warm and human places with diversity and charm, full of festival and delight; that they are degraded by tacky, tasteless places and are oppressed by coldness and indifference; that they are uplifted by the creative caring which that demands; that we believe everything matters; that all detail is important."

- James Rouse, urban planner and civic activist

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Abstract

Background. Pediatric primary care providers have been on the front lines of health reform in their efforts to improve mental health care access for children and youth. Their success in mental health promotion is greatly determined by the organizations in which they work, making it vital that all staff be aware of and address potential barriers and facilitators. Yet we lack a common language for talking about organizational context and easy-to-use tools for its assessment. ***Methods.*** A chronology of lessons learned about incorporating evidence-based treatments into real-world practice was presented to illustrate the need for greater attention to organizational context. To explicate how organizational context is defined and measured through surveys, we conducted a systematic review of the empirical health services literature. Lastly, we described the development and psychometric properties of a revised tool for assessing a pediatric practice's context for mental health service implementation. ***Results.*** Organizational context was defined as encompassing four domains: culture, systems/structure, climate, and technology. A Pediatric Primary Care Office Inventory was developed to include items in each of these four domains that relate to mental health and that have been shown in empirical research to be associated with implementation, staff, service, or client outcomes in pediatric primary care. The tool was administered to Ohio Building Mental Wellness (BMW) Learning Collaborative (n=240 derivation sample) participants. For context domains, we measured average to high between-practice differences (ICC) (range: .04 to .13) and moderate to very strong within-practice agreement (IRA) (range: .74 to .84). Cronbach's alpha was high (rage: .75 to .95); convergent item-domain correlations (mean: .71) were higher than discriminant item-domain correlations (mean: .39); and CFA revealed adequate fit when applied to a validation sample (n=165) in which two items were removed (SRMR=.071, RMSEA=.088, CFI=.924). Significant correlations were found between the culture domain and an application of the competing values framework (r=0.24) and between the climate domain and the burden/feelings domains of the short version of

the Physician Belief Scale (r=-0.60/r=-0.46). ***Conclusions.*** Organizational context is an important concept given its known association with staff, service, and client outcomes, and success in taking on new quality improvement tasks. A final version of the Pediatric Primary Care Office Inventory is in development, but in the meantime, the preliminary version represents an adequately reliable and valid measure of a pediatric primary care practice's culture, systems/structure, climate, and technology for mental health service implementation.

Background

Nearly a century of research has demonstrated that in health care, as in a marketplace, the environment in which services are delivered matters. From a practitioner perspective, "organizational context" affects one's experience of caregiving and capacity to innovate (Aarons, Hurlburt, & Horwitz, 2011; Glisson, Dukes, & Green, 2006; Greenhalgh et al., 2004). Among health service researchers, it is increasingly recognized as a worthwhile target of health service interventions (Bloom & Farragher, 2013; Glisson et al., 2013). And for clients or patients, being cared for in a healthy context, in and of itself, is known to facilitate recovery (Callahan, Repeta Jr., & Sherman, 2014; Ulrich, 1991). As pediatric primary care providers seek to adapt to rapid changes in the health care marketplace, the need to define organizational context and pinpoint the features that are most salient to change has never been more apparent. A better understanding of the concept is also needed to support translation of research into client outcomes, as evidenced by calls for inquiry into the context in which clinical interventions are implemented (Glasgow et al., 2012) and the proliferation of frameworks to measure context alongside treatment effectiveness (Damschroder et al., 2009; Proctor et al., 2011).

This article presents an overview of how "organizational context" is defined and measured in the pediatric primary care, family medicine, and child welfare service (from this point forward referred to as "pediatric primary care") literature and the psychometric testing of a

preliminary revised version of the American Academy of Pediatrics Mental Health Practice Readiness Inventory (2010). The original inventory was published as a tool to help practices "assess the extent to which their office systems promote and support mental health practice" (p. S129). We sought to modify the tool to measure both clinician attitudes toward mental health services and the "organizational context" for mental health service implementation. This represents a departure from the original tool, which is more systems-focused and does not include other organizational variables (e.g. organizational culture) and psychological phenomena (e.g. attitudes toward change) commonly assessed as components of readiness (Lehman, Greener, & Simpson, 2002; Weiner, Amick, & Daniel Lee, 2008). We also restructured the tool to be completed by each staff member individually, allowing for "organizational context" to be operationalized as a composite of staff perceptions (Jones & James, 1979).

Like other focal concepts that have been the subject of explication – from "accountability" (Emanuel & Emanuel, 1996) to "organizational readiness" (Weiner et al., 2008) to "organization change" (Burke, 2014) – there are a wide range of interpretations of the meaning of "organizational context" and of what types of questions to ask in measuring it. This lack of clarity presents a barrier for researchers seeking to use the concept reliably in the building and testing of scientific theories. It is also problematic for practitioners seeking to evaluate and strengthen "organizational context" in support of evidence-based practice. This overview represents a subset of a larger (ongoing) systematic review of the health services literature led by the author to address these challenges. Here, we take a narrower focus on how the concept has been defined and measured through surveys in pediatric primary care settings to provide theoretical support for the content of the preliminary revised version of he Office Inventory and to create a snapshot of the state of the evidence for investing in these general aspects of care.

Literature Review

Scientists from a broad array of disciplines have contributed to what we know about the role of organizational context in health care delivery, but pediatric primary care providers have played an especially pivotal role. Increasingly for both medical *and* psychosocial concerns, all members of a care team must stay up-to-date on the empirical evidence of what treatments "work," while developing strategies to adapt treatments to clients' needs and incorporate them into everyday practice. To illustrate the importance of assessing organizational context in spite of (or perhaps because of) these demands, we present a short chronology of lessons learned about bringing evidence-based treatments (EBTs) into practice. We then turn our attention to the pediatric primary care literature to explicate how organizational context is defined and measured.

Lessons from Evidence-Based Practice: Context Matters

The adaptability of child mental health treatments to diverse contexts and, conversely, the nature of the context in which EBTs are implemented are essential to translating research into client health outcomes (Battaglia, Chalmers, King, et al., 2011; Bruns, Hoagwood, & Hamilton, 2008; Weisz et al., 2013). With regard to adaptation, consider for example a recent meta-analysis of randomized controlled trials that compared the effects of evidence-based youth mental health treatments to usual care. Only a modest treatment benefit was found (Weisz et al., 2013), substantiating concerns that EBTs may be "too rigidly manualized to permit the personalization that professionals can attempt in usual care" (p. 758). With regard to how organizational contexts might in turn support or hinder new practices, much has been learned from complexity theory, which is concerned with the dynamics of change in complex social systems (Byrne, 1998). Miller, McDaniel Jr., Crabtree, & Stange (2001) were among the first to apply complexity theory to family practice. They describe practices as exhibiting natural variation in how care is delivered due to unique beginnings, histories, and landscapes, and describe a capacity for adaptation and improvisation – what they call "practice jazz" – as a hallmark of success.

> "Seeking to eliminate error by dampening all variation through the imposition of excessive standardization and external controls is unlikely to be sustainably effective…We encourage all family practice staff members to become knowledgeable of practice guidelines and EBP: these are some of the core skills of good patient care. Using these core skills to implement flexible, locally meaningful systems may reduce error. Also, efforts to change and improve future practice are best served by focusing on improving care as a whole and on developing the skills of reflective practice and relationship-centered care" (p. 877).

This and related research on "common elements" suggests that EBTs can enhance patient care when incorporated in a flexible way that builds upon a practice's unique strengths (Chorpita, Becker, & Daleiden, 2007; Chorpita et al., 2005). Yet if the services themselves are the melody and clinicians the lead violins, then the harmony and rhythm – as well as the supporting instruments – are equally essential to practice jazz. Indeed, there is evidence that aspects of patient care that are not specific to any one EBT may account for more variation in patient outcomes than therapy techniques alone (Brown & Wissow, 2012; Lambert & Barley, 2001; Shirk & Karver, 2003). Wissow et al. (2008) proposed that these cross-cutting "common factors" skills may be learned by all members of a primary care team and, as detailed in his later work with Brown (2012), may be employed alone or in tandem with EBTs (e.g. brief interventions for major symptom clusters or stepped care for specific conditions) to improve mental health capacity in the primary care setting. Common factors, with their emphasis on interpersonal skills and therapeutic alliance, are designed to influence how children/youth and families engage with health care providers during their journey of care-seeking and recovery. They do so in part by fostering sensitivity to youth/family/community cultures and by fostering cultures and climates that are conducive to mental health – a potential addition to the chronic care model (CCM) approach (Wagner et al., 1996), for instance, which focuses on organizational structures/processes and technologies.[3] Analogously, Weisz et. al (2005) envisioned

[3] Elements of the CCM include "increasing providers' expertise and skill, educating and supporting patients, making care delivery more team-based and planned, and making better use of registry-based information systems" (Coleman et al., 2009). The CCM is the organizing framework for most medical homes, including the SAMHSA-HRSA (2012) model for the behavioral health home, which has five core features: self-management support, delivery system design, decision support, clinical information systems, and community linkages.

youth/families/communities as being at the center of a continuum of care and encircled with culture "to indicate that utilization and effectiveness of prevention and treatment programs are likely to be enhanced to the extent that those interventions harmonize well with the histories, norms, and values of those the interveners seek to serve" (p. 631). Later, in reviewing findings from the Child STEPS Clinic Systems Project, designed to assess the nation's infrastructure for evidence-based practices for children, Schoenwald, Kelleher, et al. (2008) identified organizational context as a key determinant of successful EBP implementation.

Lessons from evidence-based practice suggest that means of assessing and intervening with organizational context are needed to overcome barriers to EBT translation and, in particular, to effectively implement mental health services in pediatric primary care. As health systems adopt payment models that reward positive health outcomes, the value of creating environments that facilitate whole health promotion is increasingly salient. A necessary place to begin is developing a shared understanding of how organizational context is defined and measured.

Definition of Organizational Context

Primary care practices may be thought of as parts of open systems in which the behaviors of patients and health service providers alike are influenced by factors operating at multiple social-ecological levels (Glass & McAtee, 2006). Successful organization change interventions ideally address not only individual attributes of staff, such as knowledge, attitudes, confidence, and skills, but also interpersonal relationships and the institutional and market environments that surround them (Grol et al. 2007; Leykum et al., 2014; Tabak et al., 2013). Scholars from the disciplines of business, management, health services, and applied psychology – who have contributed the bulk of literature on this concept – seem to agree that organizational context refers to attributes of both the internal ("inner context") and external ("outer context") environments and inter-organizational networks in which health care providers operate (Aarons, Hurlburt, & Horwitz, 2011; Damschroder et al., 2009; Greenhalgh et al., 2004). Since we intended for the

revised Office Inventory to assess institutional attributes that are modifiable, we focus specifically on inner context and ask: What aspects of this very general concept have been identified and measured in the pediatric primary care literature?

For the larger (ongoing) systematic review, we searched the following electronic bibliographic databases, which based upon pre-review findings, encompass key disciplines contributing to the conceptualization of "organizational context" in health care services: Business Source® Complete, CINAHL (Cumulative Index to Nursing and Allied Health Literature)®, Embase, ISI Web of Science^{SM}, PsycInfo®, and PubMed®. We identified articles whose titles and/or abstracts included at least one keyword representing each of two concepts: organizational context (keywords: organizational context, organizational culture, organizational climate, organizational structure, and organizational environment) and health care services (keywords: health care, health services, primary care, outpatient, hospital, clinic, inpatient, and outpatient). For those databases that employed controlled vocabulary, the MeSH categories "Health Care Facilities, Manpower, and Services," "Health Care Quality, Access, and Evaluation" and "Health Services Administration" and Emtree facet "Health Care Concepts" were used in combination with the health care services keywords. Logic was specified for plurals to be included and the words "healthcare" and "health care" and the words "organizational," "organisational" and "practice" to be used interchangeably. Searches were limited to journal articles written in English and published between January 2000 and March 2015. Bibliographic database searches yielded 6,003 articles, which were imported for de-duplication, screening, abstracting, and analysis into the research synthesis software EPPI-Reviewer 4 (Thomas, Brunton, & Graziosi, 2010). De-duplication reduced the total number of articles by 2,327. The remaining 3,676 titles/abstracts were each screened by two independent reviewers (the author plus one of three other reviewers) using the following inclusion/exclusion criteria in addition to language and publication date: the article (a) is published in a peer-reviewed journal, (b) is not clearly extraneous to the review, i.e. the authors assess some aspect of organizational context, (c) involves operationalization of the

concept in a health care services setting, (d) is empirical, involving assessment of some facet of organizational context identified by the authors *a priori* or the psychometric testing of an instrument with which to do so, and (e) involves quantitative measurement of organizational context through a scale or index. We excluded articles on a health care system or network of facilities ("outer context") if the researchers did not include a team, department, and/or facility level of analysis. We also excluded articles focusing on individual-level variables if this data was not aggregated to one of these higher levels to assess some facet of organizational context. Disagreements were resolved through team discussion (inter-rater reliability to date = 86%).

Thus far, the vast majority of research is on the *association* between inner context and implementation, service, staff, and/or client outcomes. Only a handful studied the *effects of interventions* on inner context or, even less commonly, the *effects of changes in inner context* on outcomes. Within these categories, we have found that each article involves one or more of the following domains: *culture*, *structure/processes*, *climate*, and/or *technology*. These domains form our nominal definition of organizational context (**Table 2.1**), which expands upon one submitted by Glisson (2002), who defined organizational context as a function of culture, structure, and climate that is influenced by change agents and affects the attitudes and behaviors of workers.

Table 2.1: Nominal definitions of inner organizational context domains

Culture	Shared values and associated behavioral norms and assumptions that explain "why" people behave the way they do in an organization (Schneider, Ehrhart, & Macey, 2013; Weiner et al., 2013)
Structure / processes	Specialization, standardized policies and procedures, and configuration of roles and authority within an organization (Pugh, 2007). We adopt Weiner's et al.'s (2013) concept of structure as emerging in part from organizational culture. To emphasize that structure encompasses planned sequences of events in health care delivery, the word processes is appended.
Climate	A composite of staff members' experiential descriptions of "what" happens within a practice and how it effects their well-being, shaped by the more stable constructs of culture and structure (James & James, 1989; Schneider et al., 2013; Weiner et al., 2013)
Technology	Built environment, tools, equipment, and other resources used by patients as they engage in health care and by staff as they carry out functions such as screening and diagnostic testing, care coordination, health information management, and way-finding.

Culture refers to the shared values and associated behavioral norms and assumptions that explain "why" people behave the way they do in an organization (Schneider et al., 2013; Weiner et al., 2013). ***Climate*** in turn refers to staff members' experiential descriptions of "what" happens within a practice and how it effects their wellbeing, and it may be shaped by the more stable constructs of structure and culture (James & James, 1989; Schneider et al., 2013; Weiner et al., 2013). When psychological climate is relatively uniform across workers, individual responses may be aggregated to the subsystem (e.g. department or team) and/or organization level, resulting in a measure of organizational climate (Glisson, 2002; Hemmelgarn et al., 2006; Jones & James, 1979). Thus, measures of consensus are typically presented alongside organizational climate measures, with one of the most common being James, Demaree, & Wolf's (1984, 1993) $r_{WG(J)}$ index, a measure of inter-rater agreement (IRA). IRA refers to "interchangeability" or "equivalence in scores" furnished by judges (i.e. staff) asked to rate a particular target (i.e. practice) and is conceptually distinct from inter-rater reliability or "equivalence of relative rankings" (LeBreton & Senter, 2008). IRA is essential to group consensus composition models; without it, "the unit-level measure – the aggregation of individual responses to the unit level – has no construct validity" (Klein et al., 2001, p. 4). Research supports the premise that climate and culture are distinct constructs (Glisson & James, 2002; James et al., 2008), and Patterson et al. (2005) provide the helpful distinction that whereas climate refers to behaviors and things "that happen" to staff, culture refers to less tangible "shared values, common assumptions, and patterns of beliefs" (p. 380).

Structure has been defined by organizational theorist Derek S. Pugh (2007) as the specialization, standardized policies and procedures, and configuration of roles and authority within an organization. We adopt Pugh's nominal definition and Weiner's et al.'s (2013) conceptualization of structure as emerging in part from culture. To emphasize that structure encompasses planned sequences of events in health care delivery, the word ***processes*** is appended. ***Technology*** was conceptualized as a final inner context domain, given its influence on

health care delivery and its interdependence with other aspects of context. It is broadly defined here as the built environment, tools, equipment, and other resources used by patients as they engage in health care and by staff as they carry out functions such as screening and diagnostic testing, communication, care coordination, health information management, and way-finding.

Development of Pediatric Primary Care Office Inventory

The Pediatric Primary Care Office Inventory ("Office Inventory") was created for use as part of Ohio Building Mental Wellness (BMW) Wave III, a learning collaborative in which 29 Ohio pediatric primary care practices were engaged from 2013 to 2015. BMW served as an opportunity to implement and evaluate a novel primary care and mental health integration intervention while at the same time exploring the role of organizational context as a determinant of implementation, service, and client outcomes. The original AAP Mental Health Practice Readiness Inventory (2010) consisted of five sections corresponding to the chronic care model (Wagner et al., 1996). Revisions included item modification and reorganization, development of new culture and climate domains, inclusion of the Quality Improvement Implementation Survey II (QIIS II) culture domain (Shortell et al., 1995), which is an application of the Competing Values Framework (CVF) (Kimberly & Quinn, 1984), and inclusion of the short version of the Physician Belief Scale (PBS) (Ashworth et al., 1984; McLennan, Jansen-McWilliams, Comer, Gardner, & Kelleher, 1999), which is a measure of primary care clinician attitudes toward psychosocial aspects of patient care.

The **structures/processes** and **technologies** domains represent indices, where individual items are aggregated into a composite score indicative of the presence of structures/processes and technologies that are supportive of mental health practice. For these domains, items from the original AAP index were modified or excluded with the following goals: (1) they be applicable to all primary care staff, (2) they be concise and ask about a single dimension of an issue, and (3) they use terms familiar in the Ohio setting. *Community resources*, *support for children and*

families, and *delivery system redesign* items were modified and reorganized into three subsections of the structure/processes domain. *Decision support for clinicians* items were modified and reorganized into the technologies domain. *Health care financing* and *clinical information system* items were excluded. The former subject was not addressed in BMW and the latter was captured through other instruments.

The new culture and climate domains were designed as scales, whose composite scores are meant to reveal levels of the latent variables organizational culture and climate. General perspectives / dimensions that were considered in developing these new domains and empirical research that informed the wording of individual items are summarized in **Table 2.7**. We sought to measure a general **culture**, and by surveying all staff and assessing agreement, allow for exploration of subcultures and culture strengths. We took the perspective of culture as values and artifacts, which are more readily measurable through a survey than assumptions. Items were informed by cultural attributes that prior research suggests may facilitate implementation of mental health services in pediatric primary care: mental health is positioned as a primary organizational goal and strategy (Schneider, 1990); research evidence relating to a mental health services in pediatric primary care is valued (Van Patter Gale & Schaffer, 2009); responsibility for mental health care is shared across all functions and levels (Alexander et al., 2005; Grumbach & Bodenheimer, 2004; Kaissi & Parchman, 2009); and practice change to promote child mental health is supported and rewarded (Rogers, 2003). Culture items were worded to reflect *group* and *developmental culture* types identified by Kimberly & Quinn (1984), and thus the QIIS II provided validation. We took the perspective of **climate** as role, job, leadership, workgroup, and organization characteristics as proposed by James & Sells (1981), who suggest a positive association between climate and attitudes, and thus the PBS provided validation. Items were informed by measures of climate used in primary care (Becker & Roblin, 2008) and child welfare settings (Glisson et al., 2008), and again by attributes that prior research suggests may relate to implementation, such as stress/chaos (Ohman-Strickland et al., 2007) and burdens such as

caseload and paperwork (Stiffman et al., 2001). The instrument was iteratively assessed and revised by eight members of the BMW core implementation team, including three physicians, four Ohio AAP staff involved in practice transformation support (including two registered nurses), and one researcher. It was also administered to about a dozen primary care staff to assess face validity and ensure it could be completed in 15 minutes or less.

The final Office Inventory contained 56 items divided into five domains. Three aspects were measured on an ordinal scale where 1 is strongly disagree and 10 is strongly agree, including office structures/processes (15 items); office culture part I (6 items); and office climate (10 items). For office technologies (5 items), clinical staff rated each item "agree" or "disagree." Domain scores were calculated for each respondent as the percent of items in the domain marked "agree." The QIIS II culture domain was included in full as office culture part II (20 items) and the short version of the PBS was included in full as clinician beliefs (14 items). All BMW participants were invited to complete the Office Inventory independently at the start of ("baseline") and following conclusion of ("post") the learning collaborative. Both clinical and non-clinical staff versions were administered: Only those self-reporting as clinicians completed the office technologies and clinician attitudes domains, which were specific to screening, diagnosis and treatment of mental health conditions, and climate items 1, 2, 4, 7 and 8 were worded slightly differently for clinical and non-clinical staff. Three climate items were reverse-coded. Example "baseline" and "post" reports for a single practice are displayed in **Appendix C**.

Psychometric Evaluation of Office Inventory

Twenty practices participated in the Office Inventory at baseline and 240 surveys were completed ("derivation sample"). Three practices, including two who dropped out, did not complete "post" surveys. Among the 17 practices who participated post-intervention, 165 surveys were completed ("validation sample"). This represents approximately 78% participation at baseline and 53% participation post-intervention. Distribution of roles was similar across time

points, with approximately three-quarters of respondents self-reporting being in clinical roles at pre and post (**Table 2.2**). At both baseline and post, twenty-five respondents were affiliated with a school-based health center, while the remaining respondents were affiliated with another community- or hospital-based pediatric or family medicine practice.

Table 2.2: Roles self-reported in Office Inventory at baseline and post-intervention

Role	**Baseline ("Derivation Sample")**	**Post-Intervention ("Validation Sample")**
Social Worker	2 (2.00%)	1 (0.61%)
Physician	41 (17.08%)	29 (17.58%)
Nursing Assistant	3 (1.25%)	6 (3.64%)
Nurse Practitioner	26 (10.83%)	21 (12.73%)
Registered Nurse	43 (17.92%)	25 (15.15%)
Other Clinical Staff	59 (24.58%)	44 (26.67%)
Non-Clinical Staff	66 (27.50%)	39 (23.64%)
Total	240 (100%)	165 (100%)

The three subsections of the structure/processes domain (*community resources*, *support for children and families*, and *delivery system redesign*) were averaged to create a single structure/processes domain score that gave equal weight to each subsection. Culture, climate, and structure/processes domain scores were converted to percentages so they could be compared on the same scale as office technologies. At last, a referent-shift consensus model was used to aggregate responses to the culture and systems/structure domains to the practice level, and a direct consensus model was used to aggregate responses to the climate and technology domains to the practice level. All respondents completed the three subsections of the structure/processes domain. The technologies domain was skipped by one; the culture domain by 15; the QIIS II by 16; and the PBS by 17 respondents.

Based on a linear mixed-effects model of inner context domain with no covariates and a random intercept for practice, baseline scores were on average 68% for *culture* (95% CI: 64 to 72%); 64% for *structure/processes* (95% CI: 59 to 67%); 66% for *climate* (95% CI: 63 to 68%); and 62% for *technology* (95% CI: 54 to 70%). Between-practice differences for each inner

context domain at baseline was calculated using an intra-class correlation coefficient type 1 (**Table 2.3**). The average estimated standard deviation of practice-specific random intercepts around inner context domain means was 7 points, and staff scores within a given practice varied on average by 22 points. An average ICC value of 0.068 suggests that 7 percent of total variation in inner context scores was attributable to differences between practices in their average inner context scores. Estimates ranged from average (0.04) to high (.13) for the primary care setting (Adams et al., 2004), indicating that a staff member's inner context ratings were influenced by the practice to which he or she belonged. Between-practice differences were statistically significant for culture, structure/processes, and technology, but not for climate.

Table 2.3: Estimates of between-practice differences for baseline inner context domains (20 practices, 240 respondents)

Domain	Fixed Effects Coefficients (95% CI)	Random Effects Parameters			ICC
		Between-practice variance (SD) in intercepts	Within-practice variance (SD) in intercepts	Total between-staff variance (SD) in intercepts	
Culture	68% (64 to 72%)	52.0 (7.21)**	382 (19.5)	434 (26.71)	0.120
Systems/Structure	63% (59 to 67%)	40.7 (6.38)*	424 (20.6)	465 (26.98)	0.0875
Climate	65% (63 to 68%)	10.8 (3.29)	237 (15.4)	248 (18.7)	0.0437
Technology	62% (54 to 70%)	151 (12.3)**	1035 (32.2)	1186 (44.5)	0.127

* $p<0.05$, ** $p<0.01$

IRA or within-practice agreement for each inner organizational context domain rated by all staff at baseline was assessed using the $r_{WG(J)}$ index, which ranges in value from 0.00 (no agreement) to 1.00 (perfect agreement) (**Table 2.4**). Average IRA based on the uniform theoretical null distribution (i.e. assuming no systematic bias in rating given participants' anonymity) for practices whose scores were within range was .78 for culture (n=18, range: .53 to .95); .84 for structure/processes (n=16, range: .64 to .96); and .74 for climate (n=18, range: .49 to .93). These ranges reflect moderate to very strong agreement, based on LeBreton & Senter's (2008, p. 836) heuristic for interpreting estimates. Out-of-range IRA estimates indicated some degree of disagreement in five practices, highlighted in **Table 2.4**, where one or more

domain scores were negative or exceeding one. Practice 17 submitted only three surveys before dropping out; out-of-range values were therefore an artifact of sample size. Practice 2 demonstrated complete disagreement on structure/processes, with each of eight respondents rating a different value. In the remaining three practices, out-of-range values appear to have reflected "multiple true scores" (LeBreton & Senter, 2008, p. 827). In Practice 3, non-clinical staff gave high systems/structure ratings, whereas clinical staff gave average to low ratings. In Practice 19, physicians and nurse practitioners rated culture and structure/processes high, whereas registered nurses and clinical resource assistants gave either very high (i.e. 10/10) or very low (i.e. 1/10) ratings. In Practice 21, physicians and nurse practitioners gave average to high climate ratings and medical assistants gave very high or very low ratings. Skewed null distributions included for comparison to the hypothesized null distribution produced multiple out-of-range values. Overall, the presence of both moderate to high IRA and ICC suggests that within-practice consensus was not just a reflection of high agreement on scores across our entire sample, but rather a tendency for staff from the same practices to give similar ratings (Glisson et al., 2008).

Table 2.4: Estimates of within-practice agreement* for baseline inner context domains (20 practices, 240 respondents)

	Office Culture			**Office Climate**			**Office Structure/Processes**		
Null Distribution	Uniform	Slight Skew	Moderate Skew	Uniform	Slight Skew	Moderate Skew	Uniform	Slight Skew	Moderate Skew
Practice 1	.528	-1.29	2.64	.556	3.46	1.49	.637	1.82	1.27
Practice 2	.528	-1.29	2.65	.659	-7.86	1.61	**-2.63**	1.32	1.19
Practice 3	.657	.0458	9.80	.811	.479	6.60	**32.3**	1.30	1.18
Practice 4	.692	.229	-10.4	.620	9.67	1.55	.734	3.31	1.33
Practice 5	.929	.895	.852	.812	.483	7.07	.955	.927	.881
Practice 6	.937	.908	.873	.843	.634	-1.10	.873	.628	2.93
Practice 7	.600	-.371	3.70	.555	3.44	1.48	.690	2.18	1.30
Practice 8	.845	.733	.516	.488	2.57	1.44	.774	-12.9	1.38
Practice 9	.792	.597	.0433	.902	.824	.650	.843	.353	1.69
Practice 10	.906	.856	.785	.824	.548	-16.3	.958	.932	.892
Practice 11	.844	.731	.512	.903	.826	.659	.887	.708	-11.4
Practice 12	.949	.927	.901	.927	.879	.799	.943	.902	.820
Practice 13	.808	.642	.228	.856	.686	-.180	.886	.704	-21.3
Practice 14	.619	-.219	4.36	.583	4.37	1.51	.798	-1.16	1.43
Practice 15	.816	.663	.305	.890	.793	.541	.677	2.06	1.29
Practice 16	.866	.778	.627	.808	.462	5.41	.958	.934	.895
Practice 17	**1.53**	1.38	1.32	**-11.1**	1.48	1.29	**1.62**	1.22	1.16

Practice 18	.896	.837	.750	.837	.609	-1.94	.955	.927	.880
Practice 19	**-.338**	2.64	1.69	.513	2.79	1.46	**-.473**	1.36	1.20
Practice 21	.824	.683	.372	**-.523**	1.62	1.33	.874	.639	3.21

* Agreement was assessed using the $r_{WG(J)}$ index, a measure of IRA representing the reduction in variance reflected if one compares the average observed variance in staff scores across items to the variance one would expect if there were complete lack of agreement. Multiple $r_{WG(J)}$ values were calculated using LeBreton & Senter's (2008) Table 2 to identify the expected variance for a 10-point scale under theoretical null distributions reflecting the hypothesized unstructured, as well as skewed, distributions (p. 832).

Internal consistency of domains with ordinal items was assessed using Cronbach's (1951) coefficient alpha, a tool for estimating item-specific variance of unidimensional measures. Internal consistency of the technology domain with dichotomous items was assessed using the Kuder-Richardson Formula 20. Measures were 0.88 for culture; 0.95 for systems/structure; 0.75 for climate; and 0.77 for technology. This reflects good consistency in light of average inter-item correlations and the number of items in each domain (Cortina, 1993, p. 102).

Convergent and discriminant internal construct validity were established by comparing the correlation of each item with its assigned domain and other domains, respectively (Hays & Hayashi, 1990; Singer et al., 2007) (**Table 2.5**). Coefficients representing the correlation of an item with its own domain are bolded and provide evidence of convergent validity. Comparison of bolded coefficients with others in the same row provides evidence of discriminant validity. Convergent item-domain correlations averaged 0.71 (median: 0.74, range: 0.36 to 0.87) and were higher than discriminant item-domain correlations, which averaged 0.39 (median: 0.39, range: 0.48 to 0.69) and were lower than their respective convergent correlations in all 108 comparisons.

Table 2.5: Item-to-domain correlations for baseline inner context domains

Domain/Item	Structure/Processes	Technologies	Culture	Climate
Structure/Processes				
Q1	**0.7786**	0.3902	0.4646	0.2911
Q2	**0.8462**	0.4612	0.5107	0.3282
Q3	**0.7850**	0.4123	0.4776	0.2945
Q4	**0.7660**	0.4238	0.5522	0.2995
Q5	**0.8454**	0.4815	0.5950	0.3188
Q6	**0.7892**	0.4331	0.5857	0.3020

Q7	**0.6903**	0.3836	0.4388	0.1977
Q8	**0.7986**	0.4711	0.5365	0.3019
Q9	**0.7393**	0.4838	0.5031	0.2732
Q10	**0.8207**	0.5719	0.6433	0.4596
Q11	**0.5526**	0.2242	0.4940	0.4146
Q12	**0.7970**	0.5371	0.6666	0.4471
Q13	**0.7067**	0.4581	0.6624	0.4300
Q14	**0.8346**	0.5315	0.6913	0.3749
Q15	**0.7798**	0.4354	0.6055	0.3334
Office Technologies				
Q1	0.4371	**0.7162**	0.4341	0.3224
Q2	0.4780	**0.7301**	0.3915	0.3435
Q3	0.4408	**0.7481**	0.4547	0.1932
Q4	0.3596	**0.6817**	0.3444	0.2417
Q5	0.4280	**0.7334**	0.4581	0.2583
Office Culture				
Q1	0.6514	0.4929	**0.8213**	0.4170
Q2	0.6939	0.5322	**0.8727**	0.4253
Q3	0.6825	0.5769	**0.8520**	0.4730
Q4	0.3795	0.2928	**0.7143**	0.3708
Q5	0.4765	0.3707	**0.7375**	0.4673
Q6	0.4252	0.3832	**0.7176**	0.2992
Office Climate				
Q1	0.3977	0.3796	0.4447	**0.7486**
Q2	0.1171	0.1767	0.1361	**0.5318**
Q3	0.2709	0.0671	0.3180	**0.5727**
Q4	0.4035	0.3799	0.4830	**0.5686**
Q5	0.1886	0.0929	0.1723	**0.3567**
Q6	0.2179	0.0482	0.2771	**0.6335**
Q7	0.2366	0.3718	0.3358	**0.6417**
Q8	0.2091	0.1323	0.2350	**0.5253**
Q9	0.1397	0.2043	0.1896	**0.4093**
Q10	0.3059	0.2154	0.3883	**0.6602**

Research suggests that while culture, climate, and structure represent distinct constructs, they tend to be correlated (Glisson, 2002; Glisson et al., 2008; Glisson & James, 2002; Glisson & Schoenwald, 2005). Pearson's correlation coefficients were computed to assess relationships between the four domains. Findings of moderate correlation between domains shown in

Table 2.6 provide further evidence of convergent internal construct validity. Content and face validity of the Office Inventory were supported by literature and expert review, respectively.

Table 2.6: Correlation matrix of association between baseline inner context domains

	Culture Domain	Structure/Processes Domain	Climate Domain	Technology Domain
Culture Domain	1.000 (n=238)			
Structure/Processes Domain	0.7070 (n=238)	1.000 (n=240)		
Climate Domain	0.5203 (n=225)	0.4306 (n=225)	1.000 (n=225)	
Technology Domain	0.5782 (n=124)	0.5939 (n=125)	0.3776 (n=119)	1.000 (n=125)

Note: All correlations significant at $p < 0.001$ level

Confirmatory factor analysis (CFA) was employed to assess the dimensionality of the latent variables culture and climate using the statistical software Stata (StataCorp, 2011). Specifically, we used our derivation sample (n=212) to assess whether the hypothesized model was consistent with staff responses to the Office Inventory. We specified that the culture and climate factors be distinct but correlated and allowed for correlation in errors between items informed by the same dimensions/values (see **Table 2.7**). Modification indices for the measurement model suggested that Culture Item 5 cross-loads onto the climate domain, which could be explained by stigma being perceived as affecting the work environment for staff as well as clients. They also suggested that Climate Item 4 cross-loads onto the culture domain, which could be explained by perceptions of collaboration and support being indicative of a culture of mental health. Modification indices for item errors suggested covariance between Culture Items 1 and 2 and Culture Items 2 and 4. The former is plausible given the similarity between having mental health as a primary goal and valuing the evidence relating to mental health. They also suggested correlation between the errors of Climate Items 1 and 10 and Climate Items 5 and 6. The former was plausible given that both safety to express ideas and opportunity to make full use of knowledge and skills could both be perceived as job characteristics. After eliminating the two

cross-loading items and allowing for correlations between Culture Items 1 and 2 and Climate Items 1 and 10, three aspects of goodness-of-fit (absolute fit, parsimony, comparative) were evaluated using the validation sample (n=138). Brown (2006) was used as a reference for standards of interpretation. The estimate of standardized root mean square residual (SRMR) was 0.071; root mean square error of approximation (RMSEA) was 0.088; and comparative fit index (CFI) was 0.924, indicating acceptable model fit was achieved with the preliminary version of the Office Inventory. Modifications indices run on the validation sample indicate that Culture Item 4 cross-loads onto climate, suggesting plausible overlap between a culture where change is "supported and rewarded" and a climate where leaders are perceived as supportive.

At last, we assessed the external construct validity of the culture and climate domains. A Pearson's correlation coefficient was used to assess the relationship between the culture domain and percent of points assigned to group/developmental culture types on the QIIS II. The positive correlation (r=0.24, p=0.0003, n=224) suggests that more positive culture domain scores reflect more group/developmental cultures. Next, a Pearson correlation coefficient was computed to assess the relationship between the climate domain and short version of the PBS. Since the PBS measures attitudes about psychosocial aspects of care and the climate domain measures experiences of providing mental health care in one's practice, one would expect these domains to be negatively correlated (lower scores on the PBS represent better attitudes). There was a negative correlation between practice-average baseline climate and baseline PBS burden domain (r=-0.60, p=0.005, n=21 practices). There was also a negative correlation between practice-average change in climate and change in the PBS belief/feeling domain (r=-.46, p=0.065, n=17 practices). Correlations between practice-average PBS domain scores and other practice-average context domain scores were also negative, but small and did not reach significance.

Discussion

A review of the empirical pediatric primary care literature revealed that organizational context could be nominally defined as the *culture*, *structure/processes*, *climate*, and/or *technology* of a team, department, unit, or facility. Research demonstrated an association between these domains of context and implementation outcomes (e.g. research use, implementation of new models for mental health care, sustainment of new services), service outcomes (e.g. equitable access, mental health service provision, continuity of care), staff outcomes (e.g. job satisfaction, commitment, turnover), and client outcomes (e.g. medication adherence, disease self-management, patient trust, therapist adherence, patient activation). A few studies demonstrated that it is possible to strengthen organizational context in support of mental health services. The ARC intervention, for example, had positive effects on culture and climate that mediated client mental health outcomes (Glisson et al., 2006, 2013; Schoenwald, Carter, Chapman, & Sheidow, 2008). Given evidence that organizational context has both direct and indirect effects on the health of primary care staff and clients alike, implementation research and economic evaluation are needed to develop context interventions and assess whether investment in these more general aspects of care would be cost-effective or cost-saving to health systems.

The preliminary modified version of the Pediatric Primary Care Office Inventory ("Office Inventory") includes new culture and climate domains, which complement items from the original inventory that assess the presence of structural and technological components of the chronic care model. Consensus among staff within practices and meaningful differences between practices supported aggregation of individual responses to context domains to the practice level. We nonetheless encountered two issues related to assessing IRA that deserve consideration. First, values calculated for our hypothetical (uniform) null distribution revealed instances where there were multiple true values for a domain. There is evidence that strength of context (Schneider et al., 2013), and certain staff members' perceptions differing from the practice-specific average

(Schoenwald, Carter, et al., 2008), may predict implementation, service and client outcomes. While the meaning of such phenomena and the mechanisms by which they influence outcomes is a current area of inquiry, multiple true values provide useful information for practices about differences across roles or teams in how inner context is experienced. However, out-of-bounds values pose a problem for including IRA values in statistical models. LeBreton & Senter (2008) suggest that alternative indices be used to assess context at the subsystem level, but in pediatric primary care, where organizations are comparatively small, dividing them into still smaller units would pose its own validity issues. Second, IRA values for multiple null distributions were reported, and the skewed distributions produced a significant number of out-of-bounds values. While this would seem to support our hypothesis of no systematic response bias (i.e. the skewed distribution is misspecified), one might question whether it invalidates our IRA calculations. Tools are needed to better interpret the meaning of multiple out-of-bounds values and to report them in useful ways.

Psychometric evaluation of the preliminary revised version of the Office Inventory supported its internal reliability and its content, face, and construct validity as a measure of the organizational context for mental health service implementation in pediatric primary care. CFA provided adequate support for the hypothesis that culture and climate are distinct constructs, but also revealed cross-loading and correlations between items that will need to be considered in development of the final modified version of the Office Inventory. The significant negative correlation between practice-average baseline burden scores on the PBS and practice-average baseline climate may be suggestive of a reciprocal relationship between organizational climate ("perceptions of the environment") and individual attitudes ("emotional responses to the environment"). Potential contextual effects of climate will be studied in subsequent analyses.

A major limitation to the preliminary modified version of the Office Inventory is that it was developed for a specific statewide initiative. The final revised version will include items related to health care financing (under structures/processes and technologies) and clinical

information systems (under outer/fixed context) that were excluded to meet the needs of BMW. Items unique to the Ohio setting will be revised to be more general. The final version will also include new items informed by the results of qualitative in-depth interviews with BMW participants. At last, modifications to culture and climate items will be made based on the CFA. In the *Handbook of Psychology, Industrial and Organizational Psychology* edited by Weiner et al. (2013), it is proposed that "the set of actual practices, policies, and procedures is the linking mechanism between culture and climate, *not* a measure of either culture and climate" (p. 657). The authors submit that culture should "lead to" artifacts (i.e. behaviors, practices, routines, etc.) that are "consistent with the underlying cultural values." These artifacts, they propose, are in turn the mediators that link culture and climate. If artifacts are not consistent with espoused values, staff perceptions of climate may run "counter to the underlying cultural values and assumptions." While we concur, given the need for the survey to serve as a practical tool for identifying specific action items, our culture domain includes items directly addressing values as well as the "artifacts" that are outward expressions of these values. It is thus a measure of both cultural values and artifacts that should be consistent if practices have reconfigured roles, workflows, and incentive systems to be supportive of mental health service implementation. For the climate domain, revisions will be made to ensure items address individual perceptions and not artifacts. Otherwise, we face the issue of culture items loading onto climate "because they tap surface manifestations of underlying cultural assumptions" (Patterson et al., 2005, p. 383). For climate items, we will also make revisions to ensure the level of reference (e.g. role, team) is clear.

While the climate and culture domains were designed as new scales (domains are conceptualized as the *cause of* their items), the structure and technologies domains were adapted from an existing index (domains are conceptualized as the *effect of* and defined by their items) (DeVellis, 2012, p. 12). The decision was made, based on practical and theoretical considerations, to conduct factor analysis on the scales only. Practically speaking, while factor analysis is useful in assessing dimensionality, it would not seem useful to think about removing an index item that

we believe is important to readiness for mental health service implementation, a relationship tested by the author in subsequent analyses. Theoretically speaking, factor analysis is only meaningful for scales, where unobserved latent variable(s) are thought to determine how staff members rate survey items. That said, one of the modifications made to the original tool was to have all staff rate items independently, and significant variation was found in scores on items making up the indices. Even though elements of structure/processes and technologies can theoretically be observed, individual perceptions of them were shown to differ, revealing very real but unobservable differences in how they are experienced across roles. For the next version of the Office Inventory, the wording of these items will be revised, and EFA performed, to develop true structure/processes and technologies scales that better capture these differences and that are better integrated with the culture and climate domains. As findings of this systematic revealed, the degree to which staff ratings of context agree may be as or more predictive of positive client outcomes as the actual values of practice-average scores.

It is notable that the new culture and climate domains have a specific referent of mental health care implementation. We adopt a perspective informed by Schneider's (1975) essay on organizational climates that where measures of context are tied to a referent, such as service climate (1998), they may be of more pragmatic use to those interested in a specific end, in our case effective mental health care. Many general context and readiness tools exist, and we believe the revised version of the Office Inventory has an advantage of being short, relatively easy for all members of a primary care team to discuss, and of practical value in identifying specific barriers and facilitators to mental health service implementation that staff might choose to focus on.

Overall, the literature review and psychometric analysis support the premise that the preliminary revised version of the Office Inventory is a reasonably reliable and valid measure of the inner organizational context for mental health service implementation. The ability to look for differences in work experiences across staff roles and to create an understanding of the culture and climate in which system changes are being implemented adds richness to what information

the original tool could provide. Until the final revised version is completed and tested, this preliminary version may be useful to practices in assessing their preparedness to participate in an integration initiative and identifying strengths and areas for capacity-building when developing an implementation strategy. It may also be useful as a tool to foster cultural awareness; to create an opening to discuss staff perceptions of work climate; to motivate inter-organization sharing through data feedback and benchmarking; and to assess whether strategies are achieved.

Table 2.7: Culture and climate literature that informed development of Office Inventory

Domain Informed	Dimensions or Perspectives*	Items Informed	Key Literature
Culture	Most common perspectives are: (1) there is a **general culture** that all members of an organization identify with ("integration"), (2) multiple subcultures are more likely than a general culture ("differentiation"), and (3) cultures have strengths given varying degrees of homogeneity in workers' experiences and beliefs ("fragmentation").	All culture items	Schneider, Ehrhart, and Macey (2013) / (Martin, 1992, 2002)
	Perspective that culture operates at three levels: (1) observable **artifacts**, (2) **espoused values**, and (3) *underlying assumptions*.	All culture items	Schneider, Ehrhart, and Macey (2013) / Weiner et al. (2013) / Schein (2010)
	The competing values framework places organizations on a continuum of four culture types: human relations model (**group**); open systems model (**developmental**); internal process model (*hierarchical*); and rational goal model (*rational*). Each type varies on "competing values," which include internal vs. external focus; stability vs. flexibility; and different means (e.g. flexibility vs. planning) and ends (e.g. growth vs. productivity).	All culture items	Quinn & Rohrbauch (1983) / Cameron, Quinn, Degraff, & Thakor (2014)
	Diffusion of innovations (DOI) theory describes how a new practice such as mental health care is communicated among and adopted by members of a social system. According to the theory, each individual staff member will go through a five-step decision process involving (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. Factors that affect adoption include relative advantage of mental health care over care as usual, its fit with the current culture, how complex it seems, and staff's	Culture items 4 and 6	Rogers (2003)

	ability trial new skills and evaluate the outcomes. Points to the importance of **leaders, champions,** and **change agents** in communicating values of a culture of mental health, managing resistance, and supporting changes to routines.		
	Findings support the value of team processes being consistent with a culture of mental health, with **responsibility for mental health care shared across all roles and levels**. Alexander et al. and Grumbach & Bodenheimer discuss the relationships between staff participation / team cohesiveness and patient outcomes in mental health / primary care. While the focus of Kaissi & Parchman was structures/processes relating to the CCM, they concluded that positive context, as defined by presence of CCM components, may ultimately reflect a "more proactive team approach."	Culture item 3	Alexander et al., (2005) / Grumbach & Bodenheimer (2004) / Kaissi & Parchman (2009)
	In this case study, **change was fostered "across functions and levels"** to create a service climate. Management met and took responsibility for issues within their own domains. A retreat was held to coordinate "across boundaries" on issues "for which everyone had responsibilities" and "the CEO made it clear that **service excellence was the goal of all changes and the primary goal of the organization**" (p. 401). All subsystems of the organization were targeted in changing climate, with **managers being strategically focused on the practices to be adopted and the behaviors to be rewarded**. These "are the criteria on which employees base their work decisions, and they send a message about what is important to prospective employees" (p. 403).	Culture items 1, 3 and 4	Schneider (1990)

Climate	Perspective that like climate, like culture, operates at multiple levels. Authors identified dimensions of: "(1) *[role] conflict and ambiguity*, (2) *job challenge, importance, and variety*, (3) *leadership facilitation and support*, (4) work-group *cooperation, friendliness, and warmth*; and (5) organizational *concern and identification*" (James & Sells, 1981, p. 284)	Climate items 2, 3, 5, 7, and 9 relate to **role**; items 1, 6, and 8 relate to **job**; item 4 relates to **workgroup**; and item 10 relates to **leader support** and **organization characteristics**	James & Sells (1981) / Glisson & Hemmelgarn (1998)
	Organizational Social Context survey differentiated national sample of 100 child mental health clinics on two organization-level factors: climate and culture. Dimensions of climate factor include: stress (emotional exhaustion, role conflict, role overload); engagement (personalization, personal accomplishment); functionality (growth and achievement, role clarity, cooperation)	Climate items 1, 2 and 3 relate to **engagement** (personalization, personal accomplishment) and **functionality** (growth and achievement, role clarity, cooperation)	Glisson et al. (2008)
	Survey of Organizational Attributes for Primary Care (SOAPC) survey differentiated sample of 51 primary care practices from New Jersey and Pennsylvania on four factors representing "internal resources for change": communication, decision-making, stress/chaos, and history of change	**Stress/chaos** domain (e.g. "the staff members/clinicians in this practice very frequently feel overwhelmed by the work demands," "it's hard to make any changes in this practice because we are so busy seeing patients") informed climate items 5 and 9 **Communication** (e.g. "when there is a conflict in this practice, the people involved usually talk it out and resolve the problem successfully") and *decision making* (e.g. "this practice encourages staff input for making changes and improvements") domains informed climate item 10	Ohman-Strickland et al. (2007)
	Practice Climate Scale (PCS-12) measures six domains of climate: medical record availability, delegation and collaboration, patient focus, coordination and continuity, team ownership, general autonomy	**Delegation and collaboration** domain (e.g. "delegation of tasks among team members," "collaboration among team members in coordinating patient care"), informed climate item 4; **general autonomy** domain (e.g. "degree of personal autonomy you have") informed climate item 6; and **coordination and continuity** domain (e.g. "ability to provide	Becker & Roblin, (2008)

		continuity of care for your patients") informed climate item 7. Practice climate was associated with **patient trust** in the clinician, and trust was in turn associated with patient activation, informing climate item 8.	
	Organizational burden (i.e. "difficulty meeting licensure requirements, managed care limitations, gaps in services, limited funds, inadequate information systems, too few qualified staff, large caseloads, too much paperwork, and inadequate clinical supervision") was found to directly influence service provision in mental health care.	Climate items 5, 7, 9	Rubin Stiffman et al., (2001)
Both	Systematic review of culture and climate instruments in biomedical literature revealed the following dimensions: *leadership characteristics* (e.g. leadership styles, such as degree and type of supervision, degree of support and trust, degree of aloofness, and type of leadership hierarchy), (2) *group behaviors and relationships* (e.g. characteristics of interpersonal interactions, group behaviors, perceptions of coworker trust, group cohesion), (3) *communications* (e.g. formal and informal mechanisms for transfer of information and for conflict resolution), and (4) *structural attributes of quality of work like* (e.g. rewards, working conditions, hours, overtime, and job security)	Climate item 10 and culture items 4 and 6 relate to **leadership characteristics**; culture items 1, 2, 3 and 5 and climate item 4 relate to **group behaviors and relationships**. Climate item 10 and culture item 4 also relate to **structural attributes of quality of work life**.	Gershon, Stone, Bakken, & Larson (2004)
	Authors used their Evidence-Based Practice (EBP) Changes Survey to identify facilitators and barriers to adoption. Facilitators include "having personal interest in the topic or practice and change **personally valuing the evidence**" and barriers include "**insufficient time**." They discussed the need for a **leader or champion**, **support of practice change at all levels**, **alignment of organizational strategy with the EBP**, **resources to implement**, and **emphasis on patient benefits and value to staff**, which relate to inner context and are consistent with DOI theory.	Culture items 2, 3, 4, 6 Climate item 9	Van Patter Gale & Schaffer (2009)

*Note: Specific dimensions/perspectives informing Office Inventory (OI) items are in bold font

CHAPTER THREE: MANUSCRIPT TWO

'We're trying to bridge the gap': Narratives of Organization Change in a Statewide Initiative to Integrate Mental Health and Pediatric Primary Care

"The course of urban anonymity, of individual divorce from the general social life, erodes the foundations of democracy…millions of our people feel deep down in their heart of hearts that there is no place for them—that they do not count."

– Saul Alinsky, *Reveille for Radicals*

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Abstract

Background. If there were one finding that all evaluations of medical home and chronic illness care projects have in common, it's that the environment where people deliver and receive health care matters. Organizational context is not only a key determinant of the success of practice change interventions, but also increasingly recognized as a worthwhile target. Ohio Building Mental Wellness (BMW) Wave III served as a case study through which to explore how pediatric primary care providers on the journey to mental health integration perceive context as shaping their experiences with a Learning Collaborative and taking on new mental health care tasks.

Methods. Semi-structured in-depth qualitative interviews were conducted with a purposive sample of 24 clinical and non-clinical staff participating in BMW. We adopted a hybrid grounded theory and framework approach, with some questions being open-ended, allowing thick descriptions of aspects of organizational context identified by participants, and others directly probing domains we identified *a priori* (culture, structures/processes, climate, and technologies). We used level of program uptake as an analytic lens, juxtaposing how narratives from practices that dropped out or were "lagging" in uptake compared "average" or "leading" uptake practices. The competing values framework served as a secondary lens through which to analyze narratives.

Results. Ten major themes arose from interviews: All "leading" practices described *project champions and support from senior leadership* and *all-staff participation and teamwork*; most lagging practices lacked a champion or leader support and had minimal cross-role participation. Cultural shifts were evident from descriptions of shifts in shared staff expectations to treat *mental health as part of whole health* and client attitudes toward mental health. Policies and incentives did not always align with these cultural values, however, as evidenced by climate descriptions of *time constraints and role conflict* and the call for *therapeutic social environments* that support the wellbeing of staff. Involvement of staff in non-physician and non-managerial roles was common among practices with more group-oriented cultures and these values, combined with having

participants with *lived experience and sense of mission*, helped some practices overcome disincentives. Leading practices were more likely to *position BMW aims among their organization's overall strategic goals* and to take time from the outset to *formalize roles and reconfigure workflows*. At last, small technological changes such as *introduction of screening and assessment tools* and enhancements to the *built environment* served as visual reminders of mental health and spurred changes in social processes such as patient-provider communication.

Conclusion. Organizational context is an important aspect of pediatric primary care that should be considered as providers embark upon efforts to implement mental health services. The extent to which practices have "group" values, and the time/financial barriers they face, will influence the mix of strategies they will need to engage in on their journeys. For practices situated in our nation's most underserved communities, internal strategies are unlikely to be sufficient, and policy changes are needed to support pediatric staff in responding to trauma.

Background

Between 13 and 20 percent of children and adolescents are estimated to be living with a diagnosable mental health condition (CDC, 2013). Yet only about half those who need them go on to seek mental health services (Merikangas et al., 2010). This is explainable in part by the inequitable distribution of the mental health workforce (Holzer, 2013; Thomas & Holzer, 2006; Thomas et al., 2009), disparities in health care access (Cook et al., 2013), and stigma that prevents many who could access care from doing so (Corrigan, Druss, & Perlick, 2014). Pediatric primary care and family medicine providers nationwide are leading efforts to address these issues by transforming their practices to place equal value on physical and mental health. This includes for example delivering brief interventions in-house and enhancing patient-provider mental health communication (Wissow et al., 2008; Wissow et al., 2011).

A domain of practice change interventions that has received relatively little attention to date is "organizational context." Nationwide evaluations of medical home and chronic illness care projects have identified a myriad of organizational factors driving change, including engaged leadership and restructuring of practices into teams (Abrams et al., 2013), cultures of quality improvement (McAllister et al., 2013), positive perceptions of climate (Lin et al., 2005), and information technology systems that facilitate coordination and decision-making (Nutting et al., 2011). At the same time, there is growing evidence that fostering social and built environments that are themselves conducive to healing is critical to client health outcomes (Bloom & Farragher, 2013). In short, organizational context may not only be a determinant of the success of interventions to implement mental health services in primary care, but also a worthwhile target.

This study reports on the qualitative findings from a collective case study of 29 community-, school- and hospital-based pediatric primary care and family medicine practices who participated in the three-year Ohio Building Mental Wellness (BMW) Wave III Learning Collaborative (LC). The aim of BMW was to implement mental health care in these settings with the goal of improving service and client health outcomes for Ohio children and families, in part by initiating shifts in the general practice context. Organizational context refers to the attributes of the internal ("inner context") and external ("outer context") environments and inter-organizational networks in which health care providers operate (Aarons, Hurlburt, & Horwitz, 2011; Damschroder et al., 2009; Greenhalgh et al., 2004). For the purpose of this analysis, we focus on the role of inner organizational context, nominally defined as encompassing the domains of *culture*, *structure/processes*, *climate*, and *technology* (**Table 3.1**). This definition expands upon that of mental health and organizational psychology researchers Glisson, Hemmelgarn, and James, who have conceptualized organizational context as a function of an organization's *culture*, *structure*, and *climate* that is influenced by change agents and that affects the adoption/implementation/effectiveness of new practices and the attitudes/behaviors of workers (Glisson, 2002; Glisson & Hemmelgarn, 1998; Glisson & James, 2002).

The aim of this study was to explore how pediatric primary care and family medicine staff perceive organizational context as shaping their experiences with engaging in a LC and taking on new mental health care tasks. We undertook in-depth semi-structured qualitative interviews with 24 BMW participants from a cross-section of clinical and non-clinical roles. Because the BMW intervention was designed in part to influence the inner context of practices, there was an opportunity for research and implementation to be mutually supportive, informing mid-course corrections to the program and creating a setting in which to explore why some practices led and others lagged in implementation. This represents to the best of our knowledge the first study to explore the organizational determinants of success in implementing a LC aimed at primary care and mental health integration.

Ohio provides an opportune setting for research on mental health and pediatric primary care integration given its range of practices – from small offices of one or two providers to the nation's first and largest pediatric ACO – and the cultural diversity of the communities in which they are located. Further, the potential for rapid translation of findings into practice is of pragmatic value given the need for more equitable access to care. The ratio of psychiatrists to youth in the United States ranges from more than 20 per 100,000 in Massachusetts to fewer than 5 per 100,000 in Ohio, where the majority of counties have no child and adolescent psychiatrist (Holzer, 2013). Nationwide, the cost of mental illness among youth ages 24 and under is estimated to be $247 billion per year (CDC, 2013). Ohio is considered one of the nation's "Medicaid hotspots" for child mental health: The top five percent of children in terms of costs account for more than half of Medicaid spending, and the majority of these costs are attributable to potentially preventable mental and behavioral conditions (http://www.odh.ohio.gov).

Primary care practices can be thought of as members of open systems in which behavior change is determined by factors operating at individual, team/unit/organization, and community/region/state levels (Burke, 2014). This exploratory research focuses on determinants of practice change operating at one specific level: that of the institution or organization. While

BMW represents just one statewide initiative, this case study serves as an opportunity to apply key theories from organizational behavior to the timely issue of mental health and primary care integration at a time when programs are proliferating. In doing so, we aim to elucidate some of the organizational factors that providers may wish to consider in evaluating readiness and building capacity and to support the development of theory-based interventions.

Table 3.1: Nominal definition of "inner organizational context"

Culture	Shared values and associated behavioral norms and assumptions that explain "why" people behave the way they do in an organization (Ostroff et al., 2013).
Structure	Specialization, standardized policies and procedures, and configuration of roles and authority within an organization (Pugh, 2007). To emphasize that structure encompasses planned sequences of events in systems of care delivery, the word *processes* is appended.
Climate	Staff members' experiential descriptions of "what" happens within a practice and "what it is like" for them working in a practice, shaped by the more stable constructs of culture and structure (Ostroff et al., 2013). When individual perceptions of climate ("psychological climate") are relatively uniform across staff, responses may be aggregated to the subsystem (e.g. department or team) and/or organization level, resulting in a measure of "organizational climate" (Glisson, 2002; Schneider et al., 2013).
Technology	Broadly defined as the built environment, tools, equipment, and other resources used by patients as they engage in health care and by staff as they carry out functions such as screening and diagnostic testing, communication, care coordination, health information management, and way-finding.

Methods

The Building Mental Wellness Intervention

Ohio Building Mental Wellness (BMW) Wave III was a statewide learning collaborative coordinated by the American Academy of Pediatrics (AAP), Ohio Chapter. The Chronic Care Model (Wagner et al., 1996) and AAP core competencies for pediatricians served as the organizing framework. BMW's aim was to support pediatric primary care and family medicine

staff in implementing mental health services, achieving coordinated and family-centered care, and promoting positive child/youth health outcomes. It did so by addressing three key drivers: individual skills, organizational context, and integration across service providers. Twenty-nine practices engaged in the multifaceted intervention from September 2013 through August 2015. This included a package of strategies for bringing about change at the individual staff and organization levels (**Appendix D**). Practices joined one of three regional groups, each undertaking the same activities, but beginning a few months apart to allow the core implementation team to give adequate attention to each practice. This team included three physicians, three AAP staff involved in practice transformation support, and one researcher.

Study Design and Sample

The qualitative interviews described herein were undertaken as part of a convergent mixed-method evaluation of Ohio BMW Wave III. A total of 29 pediatric primary care and family medicine practices enrolled in BMW, and 231 staff participated. Eleven of the practices were school-based health centers (SBHCs) from a single urban area. The others were community- or hospital-based practices in urban (n=6), suburban (n=8), and rural (n=4) areas. More than half (n=20), including all of the SBHCs, reported having a mental health specialist on staff one or more days per week; three reported accreditation as an accountable care organization (ACO); and three reported certification as a patient-centered medical home (PCMH). Non-SBHCs had on average 15 staff (range: 6 to 45) and served on average 314 patients per week (range: 75 to 775).

Practices' level of activity taken to employ BMW was measured as a function of (a) progress in achieving aims through PDSA cycles using the Assessment Scale for Collaboratives (IHI, 2004) and (b) the number of stars earned through the BMW Star Recognition System. The latter measured uptake through a series of 17 questions about implementation divided into five categories (resources, tracking, screening, engagement and brief intervention, and integration). Practices rated these Likert-type items on a scale of 1 to 4, where 1 is no testing, 2 is testing, 3 is

implementing, and 4 is sustaining. When all activities for a category were rated 3 or 4, a star was achieved, and certificates were awarded to practices achieving stars in all five categories. Practices' relative progress was monitored by the core BMW team on a monthly basis, and a final assessment was made at the end of the LC. Three of the 29 practices dropped out during the intervention. For the remaining 26 practices, a status of "leading," "average," or "lagging" was assigned by the author to denote level of uptake based on inspection of the metrics' distribution. In cases where a practice's scores placed it at or near the cut-point between two levels of uptake, the core BMW team discussed their observations and assigned the most appropriate status.

All BMW participants who attended one or more of the academic-detailing site visits received an e-mail informing them of the interviews. A Statement to Interview Participants (**Appendix B**) was attached, including study rationale, standard elements of consent, a description of the interview process, assurance that information they provide will not be shared in any identifiable way, and contact information. Each participant was invited to complete a one-minute survey if (s)he was interested in participating in an interview. This survey contained six questions that ultimately facilitated sampling. A unique participant ID and link to the survey was provided in the e-mail and staff were asked to enter the ID before completing the questions. Staff who completed the pre-interview survey constituted the qualitative interview sampling frame.

A purposive sampling strategy was chosen to ensure ample penetration into practices with varying organizational context characteristics and levels of uptake. At the time of the final academic-detailing site visit for each regional group, the author analyzed practices' uptake scores and solicited observations from the core BMW team. Baseline organizational context survey data was analyzed to assess practices' culture, climate, structure/processes, and technology scores, and average inter-rater agreement on these domains was assessed to identify practices with high or low staff consensus (e.g. potential "in-group" and "out-group" scenarios). Observations and data summaries were combined into practice vignettes that were presented by the author to Johns Hopkins Center for Mental Health Services in Pediatric Primary Care staff to promote dialogue

around sampling strategy, choosing practices with high ("leading") or low ("lagging") uptake and diverse organizational context profiles from which to oversample. Twenty-five of 31 staff who agreed to participate were contacted, and 24 staff ultimately participated in interviews.

The 24 participants were representative of 18 of the 29 practices enrolled in BMW. Of the 18 community-, and hospital-based practices, seven had one staff member participate and six had two staff participate. Of the 11 SBHCs, five (representing all grades pre-kindergarten through high school) had one staff member participate. Participants self-identified as a mixture of supervisorial (n=17) and non-supervisorial (n=7), clinical (n=21) and non-clinical (n=3) staff. Their roles included physician (n=10), nurse practitioner (n=7), registered nurse (n=2), office manager (n=1), physician or medical assistant (n=3), and billing/coding (n=1). The average number of years working at a practice was 11 (range: six months to 39 years).

Our sample of 18 practices reflects the full diversity of settings in our sampling frame. All three ACOs and two of three PCMHs participated. Practices were a mix of urban (n=9), suburban (n=6), and rural (n=3). The majority reported having a mental health specialist (psychiatrist, psychologist, counselor, social worker) on-site one or more days per week (n=12) and/or past experiences with quality improvement (QI) projects (n=13). Five practices engaged in other QI projects at the same time as BMW. All but two reported using electronic medical records to track patient progress and/or outcomes. Practices had varying levels of intervention uptake: "dropped out" (n=2), "lagging" (n=2), "average" (n=8), and "leading" (n=6).

Qualitative Semi-Structured In-Depth Interviews

The aim of the qualitative interviews was to explore how pediatric primary care and family medicine staff conceptualize organizational context as serving as a barrier and/or facilitator to the implementation of mental health services in pediatric primary care. Because the interviews served other research and evaluation purposes, as well, we adopted an interview framework that represents a hybrid between a more inductive grounded theory (Glaser & Strauss,

1999) and more deductive framework approach (Ritchie & Lewis, 2003) (see Pope, Ziebland, & Mays, 2000, for a comparison of these approaches).

A semi-structured interview guide was developed by the author to provide a framework for her interactions with staff participants (see **Appendix E**). An interactionist perspective on interviewing was taken, whereby interviews are framed as a medium for staff to interpret the role of organizational context in practice change (Miller & Glassner, 2010). Questions were thus open-ended and allowed for thick description of aspects of organizational context that interviewees identified. Some categories of questions provided staff opportunities to talk about organizational context only if it was a factor of relevance to them (e.g. barriers and facilitators to getting started). Others probed on specific context domains or went beyond the aims of this analysis, reflective of a framework approach.

Each of the 24 in-depth interviews lasted 30 to 90 minutes and took place following the final site visit for each regional group in July 2014 (n=8), January 2015 (n=10), or February 2015 (n=6), facilitating an iterative data collection, analysis, and dissemination process. Because interviews touched on experiences with office culture and climate, potentially sensitive subjects, they were conducted by the author at a private location of the subject's choice. Directly following each interview, a journal entry was made summarizing interview demeanor and context; key points/takeaways, including any insights into emerging themes and relationships among key concepts; and any gaps in information obtained by category, including questions that could be reframed for future interviews. Such a rigorous documentation protocol, as suggested by social science methodologist Russell Schutt (2009), is useful for organizing a large body of data, promoting ongoing strategizing for interviews, and beginning the process of data analysis. All interviews were digitally recorded with participants' permission and transcribed in their entirety. Given the need to rapidly translate findings into practice, preliminary results were presented to the core BMW team immediately following each interview round with the goal of identifying mid-course corrections to the intervention and emerging themes to be extended in future rounds.

Ohio BMW Wave III is itself not a research project, but components of its evaluation – including the qualitative interview procedures, interview guide, and statement to interview participants – were approved by the Nationwide Children's Hospital Institutional Review Board (IRB13-00397). All interview participants provided informed consent and each received a $25 gift card to thank them for their time. The interviewer's role as a researcher was thought to help limit the bias that might come from having interacted with staff in a teaching or evaluative role and the hesitation staff might feel to speak openly if their responses could affect their progress in the LC.

Data Analysis

Following completion of the interviews, analysis continued through re-reading of transcriptions and journal entries; coding using the data management, retrieval and analysis software NVivo; and identification of themes within each predefined category. While broad domains of inner organizational context (i.e. *culture*, *structure/processes*, *climate*, and *technology*) were identified *a priori*, and themes were mapped to these categories ("framework approach"), the author sought to identify any new categories as they emerged from the narrative ("grounded theory"). An iterative constant comparison process was used, whereby data from each interview were vetted against existing themes, and new codes added and existing codes either used, removed or refined.

To broaden the search for themes and to bring in the experience of those working directly with the practices, the core BMW team was engaged in a series of exercises where they reflected upon themes from the interviews and the association of these themes with intervention uptake. To facilitate dialogue and deliberation, each team member was provided a booklet of quotations corresponding to the 36 preliminary themes identified by the author, color-coded according to the practice's level of uptake. This process led to identifying some new themes, modifying or

combining preliminary themes into what the team agreed were more valid overarching themes, and ultimately coming to a consensus upon major themes for each inner context domain.

We explored what aspects of "inner context" staff saw as making implementation possible or difficult at their practices, as well as what aspects of inner context changed during the LC and how these changes supported or hindered individual application of new knowledge and skills. By juxtaposing stories from staff in diverse practice settings and roles, we sought to piece together a more complete picture of this concept's meaning and its role in complex change. We used as an analytic lens how staff from "drop-out" or "lagging" practices talked about culture, structure/processes, climate, and technology differently than staff from "average" or "leading" practices. Insights into the positions (e.g. as a consumer, parent, middle manager) through which staff make sense of their experiences with mental health care implementation were also sought.

The Competing Values Framework (CVF) (Kimberly & Quinn, 1984), which places practices on a continuum of four culture types (group, developmental, hierarchical, and rational), served as an additional lens through which to analyze narrative relating to organizational culture. Participating practices were surveyed using the Quality Improvement Implementation Survey II culture domain (Shortell et al., 1995), an application of the CVF, to assess where they fell on this continuum. This would help make sense of the aspects of culture participants named as relevant to their practices' progress and to their ability to apply what they learned in the site visits.

Using Lincoln & Guba's (1985) criteria for trustworthiness as a guide, credibility of the data was supported through in-person meetings with interviewees in or near their place of work and the core BMW team exercises described above. A secondary coding process and member checking were later undertaken as an additional check on the validity of the themes and illustrative quotes identified. Following the process described by Hollensbe, Khazanchi, & Masterson (2008), two coders blind to the study were asked to review the coding list (themes and categories) and a random sample of representative quotations and assign each to the theme and category that they believe it pertains to (average correctly assigned: 90%). This led to

combination of two themes that were conflated by each rater. Seven interview participants were re-contacted to discuss key findings, and each provided validation that the final themes resonated with their experiences.

Results

Organizational Culture

Organizational culture emerged as a facilitator of success at all stages of BMW implementation. Participants described how senior leaders fostered shared vision; how project champions facilitated buy-in; the necessity of collaboration across all roles to uptake; how staff drew upon lived experience and sense of mission in the face of disincentives; and ultimately how they perceived a shift in shared expectations to proactively address mental health. A few exemplary quotations have been incorporated into the results to illustrate key findings, and some additional quotes representative of this and other context domains are presented in **Table 3.2**.

Project Champions and Support from Senior Leadership

The reason that practices became involved with BMW from the start varied greatly, but when asked about adoption, most described one of the following needs: integrating mental health screening and resources for children/youth into visits; more effectively addressing issues rooted in behavior that lead to repeat visits and are difficult to troubleshoot; gaining knowledge/skills to treat common conditions in a more reliable, systematic way; and improving internal capacity for mental health care given long wait times for specialists even within their own health systems. Successful practices had a champion for change who articulated this vision, engaged staff around related activities, created buy-in, and gained the support of senior leadership. One of many examples of this champion was a nurse participant who had worked at a community action organization (CAO) in rural Ohio for 39 years. The CAO, located in a town whose residents faced

alarmingly high rates of poverty, was founded on a mission of empowering the poor. Based in a house where the interoffice mail was a rope with clips that was raised and lowered between floors, her team clearly operated on lean resources, but nevertheless achieved "leading" status in the LC. She shared how she was successful in championing BMW first at one health facility and later at six affiliated sites despite initial internal resistance.

> *Sometimes it's difficult to get people on-board…you'll run up against barriers. There's barriers in everything that you do. But if you can find a champion that's willing to take it on and spearhead it…if you just keep going back and trying to get a few people on-board and then go back again and try to get a few more people on board, I'm not going to say it's easy [laughing]… because sometimes you'll hear 'no, I'm not going to do that. I don't want to do it.' And then you go back and say 'well, yeah we really want to do this, and this is why we want to do it,' but for the most part, honestly the culture's been pretty good. And if you can [find] a champion that says 'hey, I've done this, I've tried it, it does work, just give it a try,' you know, 'just try some of the techniques that we've, you know, we've been trained in.'* – **Leading** practice w/ predominantly group (45%) culture type (20% hierarchical, 18% developmental, 17% rational)

Clinicians said they felt humbled and vulnerable in surveying their current practices and being asked to recognize that in some areas, they could make improvements, making support of senior leadership crucial. As practices moved from initial adoption to uptake and spread of BMW across their organizations, it was the champions and senior leaders who helped to motivate and sustain collective action by prioritizing the project. Participants said the former gave frequent reminders of its importance and demonstrated its utility while the latter lent crucial sponsorship support.

> *You could have a champion that beats the drum, but [they need to] have support…It came from one of our providers who is not the director, but then when the director supports that and then brings that topic up with the rest of the team in a whole-staff meeting or the other leaders of the practice start buying into some of those concepts – it's all about teaching each other what's going on, you know, 'hey, I tried this, you know this really worked' or 'here's this tool' and so on – it's about that champion becoming knowledgeable about it and kind of stepping up and saying 'I think that we should do this,' you know, 'maybe we're not as good as this as we thought we were. We have a lot of resources, but we could improve that.'* – Physician in **leading** practice w/ a relatively balanced culture type (27% group, 26% developmental, 24% rational, 23% hierarchical)

In every case where there was a champion but no support from leadership, the project failed to gain momentum, as illustrated by the following observation from a physician at a family practice in a wealthy suburb of Columbus. He was the sole BMW participant from his practice of six staff.

> ***I:*** *Well tell me a little but about the practice here. Have other staff members been involved with BMW?* ***P.*** *No. It's such a small practice that it's just me…so that's, you know, that had been one of the hopes I know of the program. It doesn't work here for a variety of reasons. One, we're very small. Two, I'm not the owner or partner. I'm an employee. And I'd say my*

> *partners aren't really interested in this, so…you know. There wasn't really any opportunity for anyone else to get involved.* – **Drop-out** practice w/ below-average group/developmental (43%) culture type (33% hierarchical, 29% group, 24% rational, 14% developmental)

Likewise, there were no "leading" practices among those that had a champion but only one or two staff participating, illustrating the dependency between a triad of program leaders, champions, and all-staff participation. As the prior examples illustrate, some practices attained uniform buy-in from the beginning thanks to visionary leadership, holding regular staff meetings to prioritize next steps and review process changes. Others like the CAO described a champion who engaged a single unit or group, demonstrating success before spreading BMW to the larger organization.

Lived Experience and Mission-Driven

The culture of a practice could be sensed not only from the content of interviews, but also from the interactions themselves. At a small practice of two clinicians and four staff in a small suburb of Cleveland, the office was visibly abuzz during the Wednesday lunch hour. One physician was on the phone planning a community reception where mental health providers, social service organizations, and staff could meet in person and talk about ways of collaborating. After she hung up, the she gave a warm greeting and offered to share her lunch. The medical assistant and nurse covered for one another while they each sat down for an interview.

Empathetic, passionate, and positive in how they talked about mental health, staff from this "leading" practice described mental health promotion as their callings both inside and outside of the office as professionals, parents and community members. They seemed to be able to stretch very meager resources because of their personal dedication to mental health, despite having among the highest volumes of patients per clinician. Indeed, they went on to achieve the highest rating in all five key areas of implementation in BMW (resources, tracking, mental health promotion and screening, integration, and practice-based interventions). A medical assistant who had worked at the practice for 20 years spoke about how lived experience might support positive client outcomes from primary care and mental health integration.

> ***P.*** *I like mental health, I find it to be a fascinating topic in general and I think that sometimes people forget about all the problems that we're seeing, especially with teenagers these days. I personally like that side of being a nurse: being able to teach and talk about those specific topics. They're a lot of interest to me. And I personally deal with a lot of that at home, so.* ***I.*** *Do you have children?* ***P.*** *I do, I have two daughters…both have some mental illness…depression, anxiety, all those [are things] they have faced. So I have done that personally…this is a nice topic to talk about here because not everybody sees that on a regular basis.* ***I.*** *Do you feel like that helps you in interacting with patients? Being able to draw on that experience?* ***P.*** *I do. I feel like sometimes people, they have a stigma about depression and anxiety and mental health in itself, so I think if you talk about some things on a personal level about what you've struggled with with your own children it does help. It makes people more open to talk.* – **Leading** practice with a predominantly group (54%) culture type (21% developmental, 13% rational, 12% hierarchical)

This is not to say that qualities such as passion or mission were lacking in organizations that lagged or dropped out. It seemed to be moreso the case that these individuals were not in leadership positions when it came to implementation or that organizational climates characterized by financial burden and limited time created role conflict, as explored in the "climate" section. That said, there were many who stated that mental health was simply not their passion.

> *You know I wasn't prescribing Prozac 15 years ago, you know, it's just, I think there's more awareness of problems, there is more in the lay media about things, so, things have just changed over the past 15 years whether it's for good or bad – I mean I think good, I mean there are a lot of kids out there that need to be treated, and they weren't, um, so, that part is better. But I don't like to do it. I mean if I had my way [laughing], if I could you know say I don't do that [mental health care], I would. It's not my love or my passion.* – Physician from **lagging** practice w/ balanced culture type (32% rational, 27% group, 27% hierarchical, 14% developmental)

Perhaps one of the most pervasive themes across practices with high uptake was how staff who view mental health as a passion or calling, and who bring lived experience to the table, play a pivotal role in carrying the organization through change and helping staff and patients overcome obstacles that would otherwise be bottlenecks. These were typically non-physician or non-managerial staff, an observation underscoring that involvement of all roles is critical. Highly mission-driven, staff with lived experience described sacrificing their own time/resources and engaging their social networks and strong ties to the community to be agents for change.

> *My plate is rather full and [the clinical manager] doesn't usually like to add things to it, so she brought this to me knowing that it was an issue, that it is important to me, close to my heart. I have a lot of mental illness in my family and, you know, my patients who suffer from mental illness are close to my heart and [I] feel helpless a lot of the time trying to find them appropriate care. So, she actually had me give up another project in order to be involved in this one, so I was grateful for that, just, you know how it is when you're working on a project that you care about, more, you're, a little bit more into it.* – Registered nurse at **leading** practice w/ predominantly group (44%) culture type (21% developmental, 20% rational, 15% hierarchical)

All-Staff Participation and Teamwork

A characteristic common to all "leading" practices was that multiple staff in different clinical (e.g. physician, nurse, medical assistant) and non-clinical (e.g. front desk, billing/coding, office manager) roles participated. While the BMW team encouraged cross-role collaboration – facilitating dialogue and development of new workflows for example through all-staff learning sessions and academic detailing – some practices had cultures that seemed to be more conducive to participation from the start. Analyzing the narrative through the lens of the CVF, cultures emphasizing "group" values seemed to be more adept at teamwork and receptive to change.

A medical assistant at a "leading" suburban practice – where clinicians reported seeing more patients per day than any other participating provider – described a sense of teamwork and trust whereby staff felt comfortable sharing in the care of patients. This practice had an exceptional 76% of points on the CVF assigned to group (54%) and developmental (22%), emphasizing participation and flexibility over productivity, stability and efficiency.

> *A lot of times we'll tag-team. We'll look at the doctor: 'Do you have this one or do I have it?' You know so it's part of the teamwork. Just making sure that one of us is at least talking about it. And if I were to be the one who roomed the patient and brought it up, I always document on a piece of paper instead of the chart. 'I did bring this up with mom, please address it in the room.' So they know before they even go into the room: 'Oh, she already talked about that, good. I'll bring it up again.'*

Likewise, the young woman responsible for billing and coding at a "leading" practice in the suburbs described a tightly-knit office "skeleton crew" who – as her own participation in BMW illustrates – saw themselves as members of the care team even if they did not regularly interface with patients. "Honestly we have a very good hands-on staff. Everyone really jumps in to take care of patients. I mean we're a skeleton crew, it's not a big hospital where patients are numbers, like we, we *know* our families," she said. The practice's lead physician said she felt that BMW was a "good fit" because "it was good for our whole staff" and that it was participation across roles that helped them overcome challenges from the onset. "It is a whole-staff thing," she said. "The [mental health screening tools] were a little challenging because we just had to think of

a flow in our office, [as] far as the whole group. And I couldn't do it all, they had to do it. But they got on-board with it." The practice had a relatively uniform distribution of points on the CVF (28% group, 28% developmental, 23% rational, 21% hierarchical).

A physician in a "lagging" suburban practice lamented that he and his colleagues had not been able to meet as a team to build consensus on how to move forward. "I think we're still in the process of struggling with whether we should be doing routine [mental health] screening [as] a department," he said. "I think what we haven't really done is really sit down as providers and talk about what we want to do with the program." This physician's colleague, a nurse practitioner who was also the practice lead on BMW, said that she struggled with a lack of time to bring staff together in the same room to create shared understanding of the purpose of BMW and to take collective action. "Again I think BMW has given us so many tools, but to be able to utilize that in a productive manner, we need to be able to develop how it will work for us," she said.
While this practice had a culture type skewed toward group (37% group, 23% hierarchical, 22% developmental, 18% rational), time constraints created barriers to staff coming together to adopt an implementation strategy, suggesting cross-level effects of culture and climate.

Of particular interest were those practices where physicians and nurse practitioners did not play significant roles on the implementation team, but where change was pushed along at a fast rate due to the skills and expertise of other clinical and non-clinical staff. As the office coordinator at a large hospital-based urban practice pointed out,

> *One provider trying to do it without the support, it doesn't go anywhere…she had interest, this nurse practitioner, [but] did you get me, an administrative person, or someone who works with the front staff, as well as the director, or some other lead? The idea of having [a team] to push it [along]… [counselor name redacted] keeps me on-track and I keep [counselor name redacted] on-track and [physician name redacted], he makes sure he signs off on everything and knows what's going on, but you know what I mean? There are always the workers that keep moving it along and say 'OK let's keep going.'* - **Leading** practice w/ a relatively balanced culture type (27% group, 26% developmental, 24% rational, 23% hierarchical)

When there was tight communication between all roles – from the front desk staff to the office coordinator to the medical assistants and nurses – progress continued even when physicians or managerial staff had mixed attitudes toward BMW or took more of a back-seat roll in the implementation process. Together, these staff worked as a team to "bridge the gap" that exists in many communities between children/youth in need and community mental health care.

A registered nurse who had been at her small suburban practice for 20 years explained how she and her colleagues at the front desk advocated on behalf of families and helped to forge links between the primary care clinic and community resources. The words "empathy" and "persistence" came to mind as she spoke of her investment in her patients' recovery.

> *At the end of every week I go through who needs to be followed up with. I know these parents on a first-name basis, and we have good bridges with physicians, psychologists and counselors, behavioral therapists in our community that we can call and say 'Hey, this is so-and-so from this practice, and we want to talk to you, we really need to get this patient in.' [When] you give a patient a referral when they leave, it's kind of depressing when you go to make that appointment and you know it's not going to be for another six weeks…So we've kind of put ourselves in the loop as the providers here and both physicians and myself call one-on-one [and] they'll look in their [schedule] and squeeze people in whether it's family counseling or an ADHD referral or just a behavioral therapist….we're trying to bridge the gap for patients, because it's hard…Not only that, [but also] a lot of psychologists or counselors' offices don't accept Medicaid [and] that's quite near and dear to my heart. [So] I have contact with Medicaid as well.*
> – **Leading** practice with a predominantly group (54%) culture type (21% developmental, 13% rational, 12% hierarchical)

The narrative illustrates the critical role that non-physician and non-managerial staff play in coordinating care for youth and families and providing advocacy in the mental health referral process. Moreover, their narratives suggest something "deeper" may be going on in their practices: the foundation for a culture of mental health.

Building a 'Culture' of Mental Health

Participants said that for practices that were already involved in a significant degree of mental health care coordination, BMW provided the framework, resources, and peer support for ongoing improvement. It was a "spur to get organized" and reinforced the notion that "what we're doing is the proper thing."

> *At our physicians' meetings we've gotten together and talked about what we feel our – how we could improve our practice in terms of screening tools. You know you've always got constraints on time and staffing and money and so-forth, but there are some things that we could do better and efficiently….so I think it's just been more on the front burner instead of the back burner in terms of discussion as to what we're going to do collectively as a practice to improve. But in terms of changing our views of mental health – has it changed what we do? No, it's not that…we've always had to address mental health and it's something we're always willing to do.* – Physician from **average** uptake urban primary care practice with predominantly group (44%) culture type (hierarchical 24%, rational 20%, developmental 12%)

For others, BMW reportedly promoted shared expectations to treat mental health as part of whole health – a shift in perspective in some cases for those practices who had had limited experience with mental health provision. Several participants discussed a growing sense of the legitimacy of addressing mental, behavioral, and social issues as part of a sick or well child visit.

> *I think that the BMW project in general has brought much attention to [mental health], and I think that is a really big asset. I think that that's – in terms of how it's changed my practice and what I would probably be doing now versus if it had not been there. I can't say that I'd be giving mental health the attention that it deserves, just because all these kids have like horrible ringworm on their head or they have heart murmurs and they haven't seen a doctor in so long that it, it really challenges you to keep focused to the holistic nature of it… I think that probably if it weren't for BMW – we get so slammed with getting through the well checks and making sure that we're seeing what we're to be seeing – that probably these things wouldn't be assessed.* – Nurse practitioner from **average** uptake school-based health center, grades pre-K through 6, w/ relatively balanced culture type (38% group, 25% rational, 23% hierarchical, 14% developmental)

Participants said that the common factors communications skills trainings had helped them to develop a shared language and more compassion and understanding toward families with psychosocial concerns. When asked about gaining comfort in addressing mental health issues on their own as opposed to referring out, many said this was an advantage of the on-site trainings specifically, which were "helpful in honing personal and interview skills" that aren't taught in more disease-focused continuing education programs. The majority of those interviewed said that since these site visits, there had been less labeling of clients as "dysfunctional" or "ill" and that people at their practice were using more mental-health-friendly and less stigmatizing language. In multiple interviews, staff described a shift in both individual staff attitudes toward mental health and shared values and associated norms relating to mental health promotion:

> *I have to say that probably attitudes from both providers and clinical staff was that – challenges. That those patients are usually challenges. So more focusing on the mental illness piece versus the mental wellness piece. So when you, I think when we started, mental health is 'OK those are your ADHD…' You know labeling your mental illnesses, versus thinking how can*

we promote mental health. When we first started, I don't think many of our providers really focused on [the] newborn period, and then I found that myself and some of the other providers really started using those tools to say, you know, about the smiling and talking to parents about how to promote mental health. So I think maybe a little bit of a change from focusing on mental illness to focusing on mental wellness. – Nurse practitioner from **lagging** large suburban pediatric practice w/ relatively balanced culture type (37% group, 23% hierarchical, 22% developmental, 18% rational)

I think that the mental health piece is also something that has contributed to our overall office understanding of dealing with these really complex populations. [C]omplex by the sense that they do not always follow instructions – what patient population does follow your instructions all the way? The frustrations that come with being late, or, really the things that are related to poverty and mental health. I think people are a lot more sensitive to those issues overall and I think that the mental health part is a component of that…I think as we had that mental health conversation people started realizing that some of the behaviors that they were seeing that they were frustrated about were really mental health problems in adults and families...they're a lot less likely to say 'oh, that kid's really bad' or 'hyperactive' or there is a lot less labeling and communication of that labeling. It is more of an appropriate 'I am very concerned about this' or 'this child is demonstrating these behaviors and I'm kind of concerned' or 'mom mentioned to me this thing that's actually important as it relates to mental health.' – Physician from **leading** large urban hospital-affiliated practice w/ relatively balanced culture type (27% group, 26% developmental, 24% rational, 23% hierarchical)

In some instances a shift in culture was evident from changes that participants perceived in their *patients'* attitudes toward and awareness of mental health. A school nurse said that while there is still great stigma surrounding mental health care, that when a family did have a positive outcome, the word was spreading quickly among social networks and, little by little, mental health care was becoming more accepted. "Kids and parents are kind of like opening up and seeing the difference, like how the kids perform in class with medication and not with medication, stuff like that," she said. She went on to say her practice had fostered a greater overall awareness of mental health. "I must say that it has made a big difference with, just the mental health in all of us as a group, as a whole health center. Everybody knows that we are dealing with that, and the word, we are getting it out, that come to us, we can help you." She and other practices serving impoverished communities spoke of the need for their clinics to serve as sanctuaries for children/youth and families who face high levels of traumatic stress and institutionalized violence.

I think that there's a tough culture here. It's not a culture that I've seen anywhere else. The kids are really spoken to in an authoritarian kind of manner…Sometimes when people come in, they'll have something serious going on or whatever else, and it will be 'oh they're faking it,' or 'oh this,' or 'oh that,' or 'oh he's having breathing issues again.' And then I listen to him and he's

> *wheezing like crazy. I think that there's a lot of doubt in the kids…but if the kids are coming in and grandma just died or dad's in jail or dad just got home or mom just got beat up or they're seeing somebody standing in the corner with a knife, and then they're being told to do their assignments, they're getting yelled at because they're not paying attention or not doing their assignments, then some kid looks at them the wrong way so they hit them, and oh they're also in suspension because they should have been doing their work but they weren't, like are we figuring out why these kids aren't doing their work? So that's where mental health comes in. Obviously us learning how to do something is paramount. We as the health center need to be able to handle this…it needs to have an effect.* – Nurse practitioner at **average** uptake school-based health center, grades pre-K to 6 (CVF: 38% group, 25% rational, 23% hierarchical, 14% developmental)

Across all levels of uptake, a few physicians expressed concern over the safety and efficacy of providing brief mental health interventions, given the limitations of their clinical scope or because they felt that youth would received more "comprehensive care" elsewhere.

> *I feel like mental health, just like any specialty, should be an option for referral, just like cardiology, just like, you know I'm not going to treat a kid with a heart murmur here, I'm going to ask a specialist to investigate…but I feel like that's one realm where we don't have enough places to help with and it's pushed back a lot on the primary care provider to manage*. – Nurse practitioner from **average** uptake school-based health center, grades pre-K through 8, w/ predominantly group (40%) culture type (23% rational, 20% developmental, 17% hierarchical)

In the few cases where participants did not name any changes to expectations for how people in their practice provide mental health care, the practice had dropped out or lagged in BMW uptake. There tended to be a climate in which incentives such as limited financial reimbursement for mental health care, combined with limited access to resources such as child psychiatrists, made the demand to serve as frontline mental health providers frustrating at best.

Organizational Structure/Processes

All 24 staff interviewed named aspects of structure when asked about barriers or facilitators to applying what they learned. Narratives clearly diverged in this category, with participants from "leading" practices focusing on how BMW innovations "dovetail" with the "bigger picture" of their organization's growth and development and "lagging" practices focusing on how their office is "split" between competing projects or "failed to see the bigger picture." When asked about organization changes made since the start of the LC, the majority of "leading" practices, but no "lagging" practices, described reconfiguration of office roles and workflows.

Minding the Bigger Picture

When activities fit with larger picture of organization's growth and development (e.g. medical home accreditation, QI projects for managed care entities, overall goals of the practice or health system with which it is affiliated), staff saw better program uptake. By fitting each piece of the LC into the bigger picture, "leading" practices optimized resources and created synergies, of particular importance given the limited time and QI fatigue so many described. As a physician at a "leading" urban hospital-based pediatric department pointed out,

> *I think part of what made the Collaborative successful was that it gave us tools to address things that also hit on our institutional mission or institutional goals. [It] fit nicely into how we think about all of the other things that we have going on in our office. And so in that sense it makes it easy. It's not like reinventing the wheel. We're not starting over. We're fitting this piece into the rest of everything else that we're doing.*

In contrast, several participants from "lagging" and "drop-out" practices described a lack of shared agenda and coordination, with the result being that it was unclear where BMW fit into standard policies and procedures and institutional priorities. As a physician at a "drop-out" urban-hospital-based family medicine practice explained,

> *I found the hardest thing is just the, you know at the same time as this project, we had another couple docs who were doing a childhood obesity project and we had another few who were working on an infant safety project, and it really starts to split what you can do, you know? Because they're not interested in another project -- they're trying to figure out their project.*

The vast majority of interview participants from "leading" practices, and none from "lagging" or "drop-out" practices, positioned the aims of BMW among the overall aims of their practice, whether this be maintenance of certification (e.g. FQHC), achieving integration (e.g. ACO or PCMH status), or satisfying managed care requirements (e.g. performance incentives). A nurse practitioner at a "leading" urban health center explained how her practice successfully achieved patient-centered medical home status at the same time as implementing BMW.

> *We are participating in [a] performance measure [where] they look across our organization and compare us to other organizations on depression screening… they wanted to make sure that we were screening from 12 on up to adulthood. And so, that was the initiative that we were hoping to get [some] extra training…we were just looking for new tools, standardized tools, and so that's been very helpful… we also did patient-centered medical home…and a lot of the BMW stuff kind of dovetails…you know [involving the whole] team, involving the patient and family in care plans…so it was kind of just an enhancement of what we're already doing.*

Formalizing Roles and Reconfiguring Workflows

The majority of participants from "leading" practices reported that reconfiguration of team roles and workflows – a process that required significant time and adjustment upfront – served as a catalyst for individual involvement, collective action, and application of new skills.

> ***P.*** *I think that probably if it weren't for BMW – we get so slammed with getting through the well checks and making sure that we're seeing what we're to be seeing – that probably these things wouldn't be assessed. So this is a great project.* ***I.*** *Do you think that by changing those procedures – that by having the screening and referral processes set up – that it's supported you in applying some of your new skills as a clinician? Having those systems in place?* ***P.*** *Yeah, I think that, well with the system being in place – and you're part of the system – you have to figure out how to do your part to make the system work. So it puts the pressure on you to realize – I mean it propels you. It's a catalyst.* – Nurse practitioner from an **average-uptake** school-based health center, grades pre-K to 6

Participants used BMW as an opportunity to re-examine workflows, and changes to these processes in turn led to staff clarifying their roles and making additional process changes. The fact that some teams were more successful at this than others exemplifies how organizational structures may reflect the cultures from which they emerge, as illustrated by the following quotation from a practice with highly group (54%) and developmental (21%) culture.

> *So I think a lot of it was being able to lean on each other as a team while we were addressing these concerns. It was hard, you know because we all have jobs and we're all busy here…And once we got in the flow, it went great. But I'd say the first month was rough. Just to just add something new; it's like changing a process at the office. You know, getting into that flow was hard, but once we did it's like nothing now. You know, you do it 10,000 times you become a master.* – Medical assistant from a **leading** small suburban practice

In cases where processes/roles were well-defined from the beginning, participants described focusing more on the quality of patient/provider interaction. Where the information and skills disseminated through BMW were things staff already "knew" or implemented informally, participants said they were held accountable to formally incorporating these activities into their daily routines in a consistent manner and formalizing staff's roles in carrying them out.

Organizational Climate

Climate emerged as a facilitator of BMW – not just through the content of what participants shared, but also from the valence with which they spoke about their day-to-day

experiences of what it's like working in offices with very different cultural norms, structural characteristics, and outer contexts. Participants from "leading" practices described a climate where workers exercised their autonomy as change agents and where their individual contributions to practice change felt valued, a subject not brought up by participants from "lagging" or "dropout" practices. While all participants said the single most important resource for facilitating mental health care was "more time," staff from "lagging" and "dropout" practices tended to focus on time loss, whereas staff from "leading" practices reported the potential for greater efficiency.

All-Staff Participation and Teamwork

Staff in "leading" practices were more likely to talk about feeling their role in change was "appreciated" and their "opinion valued" and to have staff in non-managerial roles share the gratification they felt in being "an agent for change." Climate emerged as a key facilitator of initial program uptake in these practices, as evidenced by staff feeling positive about shifting time and focus to mental health; having the autonomy to assert their opinions and take risks; and perceiving that their efforts were recognized by leadership. In this way, climate reflected a culture of mental health in those organizations where incentives aligned with these cultural values.

> *And how about [your] personal experience working at [practice name redacted]? Do you think being part of the Collaborative affected your day-to-day work in a positive or negative way?* ***P.*** *Definitely positive. Any time that your employer, you know, wants to [inaudible] improvement I think makes you feel good about where you work. And the fact that they feel you could be an agent for change, that makes you feel good about, you know, working for them, that [practice name redacted] is a great place to work…I always feel appreciated and needed and, um, my opinion feels valued and things like that, so, um, all of that continued and persisted.* – Registered nurse, **leading** suburban pediatrics practice

The subject of being a change agent did not arise in interviews with non-managerial and non-physician staff from "lagging" and "dropout" practices, although there was some mention of wanting the online skill-building modules to be more broadly applicable to all staff. This nurse described a situation where the program activities themselves may not have been in alignment with mental health, to the detriment of the climate for nurses:

> *I'm thinking that it would be beneficial for clinical staff also, to be able to say 'oh, yeah here are some tools I think you could use.' I think as we move to population health and focusing more on prevention and coordination of care, clinical staff will really have some empowerment for them to be able to utilize some of these tools. And as of right now I don't think that's an area that we've focused on. It's focused so much more on the provider, which again I get it, I just think the clinical staff is, they're knowledgeable, and especially for the RNs, to have the ability to say 'oh, have you tried this tool,' I think it would be helpful. – Nurse practitioner,* **lagging** suburban pediatric practice

Time Constraints and Role Conflict

Every participant named time as a source of concern in primary care, making this by far the most prevalent theme. The question is why some reported that the communication and brief intervention skills taught were a source of efficiency, whereas others said that attempts to apply what they learned resulted in time loss or feelings of frustration and role conflict. Narratives revealed that the answer is likely complex, with outer context (e.g. finance, neighborhood environment), culture, structure/processes, and climate affecting the degree and quality of uptake.

Among "lagging" and "drop-out" practices there was more negative valence, with phrases such as "worried about efficiency," "competing demands," and "overwhelmed" being used to describe the daily experience of working in their practices. Participants described outer contexts characterized by inadequate financial reimbursement for mental health care, large caseloads of complex patients, and a dearth of community mental health resources. They expressed feelings of role conflict, as did this physician from a small suburban practice that had dropped out.

> *I wish I knew about the natural history of bipolar disease. I don't, you know and what I find now is that, you know, I not only need to learn about that, you know I need to learn about nephrotic syndrome, I need to learn about the proper work-up [of] joint pain…I've got all these other, you know, purely medical things that I also have to get up-to-speed on…I guess if there's something I hope goes into your report, [it's] that there is a huge mental health staffing crisis in this country and pediatricians are going to be the ones -- we are already the ones who take care of most of these kids. Until somewhere months down the road they can actually get into a psychiatrist or a psychologist or a counselor. And I [sighs], I just, feel very frustrated.*

A participant from an "average" uptake practice that had come close to dropping out near the end said that despite the potential for better patient outcomes and efficiency, she felt

conflicted in implementing brief interventions at her FQHC, given that they operate on extremely thin margins. "It was hard for me to be able to get permission to block out patient care for this," she said. "I mean, our entire network finished *five dollars* in the clear last year." She continued,

> *I've always had an interest in mental health…I mean the more training I can get, the more it will help. But one of those issues you run into [is] that I'm paid the same whether I'm in the room for 5 minutes or 55 minutes. OK, the pay rate is not based on time and complexity of the patient. It's I walk in a room and I bill. You know I code it differently, but I get paid exactly the same amount…It's a loss to do anything beyond the simple visits. There's no motivation to get doctors or health care providers to do complicated patients. You're actually hurting yourself when you do that…You've got to churn them, you've got to get them through. Here, the focus is on taking care of patients, but there's still no motivation to primary care doctors.*

Participants from "leading" practices who discussed time constraints talked about them as transient ("the initial introduction of the program was a little bit stressful") and with less negativity ("the way the schedule goes in a typical pediatrician's office"). These organizations faced some of the same outer context constraints as the others, but drew upon a sense of mission and calling in justifying the additional time that implementation required. Where perverse incentives existed, mental health promotion became an intrinsically-motivated activity, as exemplified by this medical assistant from a "leading" small suburban practice.

> *If they call first thing in the morning and address a concern with us, we're always going to squeeze them in. We never blow them off. If I have to stay an extra hour at work, I stay the extra hour. You don't want to come in the next day and find out there's been a case of SI [suicidal ideation] and there's a patient in the ER…so, yeah if it's just an extra hour out of my time, I'll absolutely address it because I'd want somebody to do that for my kid for sure.*

Thus, it wasn't just differences in outer contexts, but also how participants reacted to these contexts in light of practice cultures, that contributed to differences in how staff spoke about time. In some instances staff from the same practices had differences of opinion over whether the time invested in the beginning was "worth it" to them, perhaps pointing to how people in different roles may experience cultures differently or to the existence of microclimates across teams and units. This scenario is exemplified by these different perceptions of time coming from a medical assistant and physician, respectively, who work in the same "lagging" rural pediatric practice.

> ***P:** We are actually getting more people coming in due to the increased rate, so. **I:** The increase rate? **P:** We're seeing more patients, like the flow, we are able to see more patients due to the efficiencies. **I:** That is amazing, because it [sounds] as though you are providing more*

> *services.* ***P.*** *More services. We're able to. Because we're not so backed up. We're able to because we're incorporating everyone, their input.*
>
> *They did try to get us all to do the [mental health screening] and we can't start that yet until they come up with some better staffing for us. But no, I don't know of anything that everyone did…our department in general is not in a good place with staffing, so I don't think that it's a great time to try to initiate. I mean our staff is just so overwhelmed that to ask them to do one more thing…*

There was also some indication that time became an issue when BMW was not fully or properly implemented, in particular when attention was not paid to optimizing structures/processes for mental health promotion. For example, while many practices updated workflows to administer screenings in an efficient manner, sharing the burden across staff in multiple roles, others left this to the physicians to handle in the exam room, leading to longer visits and a feeling of backlog.

Therapeutic Social Environment

Driving through an urban Appalachian neighborhood, past row-homes with boarded-up windows and empty lots, on the way to one of the school-based health centers, the economic disadvantage facing youth was palpable. Teenagers were hanging out in the cramped parking lot with their dogs, as the school day had just come to a close. The nurse at the school-based health center was hurriedly speaking with a colleague about a patient; visibly flustered, she was at the same time printing out a many-hundred-page document that she had to read that evening.

The nurse had been working for nearly a decade to promote health at her school-based health center and said she saw each success story as a huge win, given the power of social networks in her neighborhood. "The culture of Appalachia," she said on multiple occasions, "is to stick together." Yet the toll a stressful work climate may have been taking on her own health was evident when, at the end, she confided that she herself had few people to lean on when she had clinical questions or a bad day, and that her job often made her feel overwhelmed and depressed.

> *It's hard because I come from a different society, a different place, and maybe of course I don't understand what they're going through. If I say 'I understand what you're going through,' I'm very wrong. Maybe I have food on my table, I have shelter, they don't. A lot of them are homeless. So I do not understand what they're going through. So that was something that I learned that, OK, 'how can we, you tell me how you can change, like, taking baby steps.' So that was hard. It was really hard. It is very hard. It's depressing too, listening to their story. You would rather treat an*

> *ear infection and asthma quicker than seeing a patient with [significant mental health difficulties]. Sometimes I just sit there and wonder 'what do I do now.' So it's hard.* – **Average-uptake** school-based health center, pre-K through 8th grade

Across all levels of uptake, there was evidence of the need for the social environment to be therapeutic to staff, whose roles are not only intellectually challenging and fast-paced, but also can be emotionally exhausting, putting them in danger of secondary trauma. Some participants reported a sense of relief after implementing new skills and processes learned through BMW.

> ***P.*** *I'm not as stressed as I was a year ago. Like this time last year, I would be somewhere screaming and kicking, wanting to walk out, but you know I'm more relaxed and more calm and just, I just know I am able to prioritize what's important, what needs to be done. And just, I'm more laid back at this point.* ***I.*** *So what would be one of those situations you think a year ago that you might be able to handle better now? If you were to provide an example?* ***P.*** *Yeah, I mean, we're seeing non-stop patients and then we're having one patient coming in for a list of issues, we're short of staff, and just I mean, it would be just non-stop, it would be just a clutter of things, and now I am able to say: 'What needs to be done first?' To prioritize. Because we do a variety of things for one office with no extra help, so it's like I have this to do, so I am able to say 'OK this can wait 'til later, this is more important now,' so I am able to separate them, know what needs to be done, and then just check things off and my day goes by much smoother and I'm not so frustrated and flustered.* – Physician assistant from small **lagging** practice in rural area

Organizational Technologies

By far the most pervasive observation made by participants was how seemingly small changes to organizational technologies spurred change to less tractable social processes, whether these be systems of care delivery, patient/provider communications, or uptake of the program. All participants brought up how the implementation of mental health screening and assessment tools or changes made to the built environment had served to facilitate service and client outcomes.

Mental Health Screening and Assessment Tools

After-school programs were long underway at an elementary school in northern Cincinnati, and yet none of the health center staff had gone home. The providers huddled in an exam room; earlier in the day they had mobilized their first crisis response, and now they were solidifying a safety plan. When she emerged from the room an hour later, the nurse practitioner explained that a teenager had shared concerning thoughts during his well visit and had been transported to a mental health specialist. The staff – while still visibly upset – were expressing

their relief that the boy was safe and that he and his family had already begun working on a care plan. The screening implemented through BMW, she said, may be the reason the teen was on a path to recovery.

> ***P.*** *Were you guys the ones [who] told us to ask 'has anything bad, scary or sad happened?* ***I.*** *That sounds like part of BMW, yes.* ***P.*** *And that's why I might have a kiddo that's diagnosed with schizophrenia. And so I just asked that question and then he was like, 'well yeah, but it only happens to me,' and then proceeded to tell me this story about what's going on…You learn a lot from that question. That is brilliant, and I've incorporated that into my practice…I think that the BMW project in general has brought much attention to [mental health], and I think that is a really big asset. I think that that's – in terms of how it's changed my practice and what I would probably be doing now versus if it had not been there. I can't say that I'd be giving mental health the attention that it deserves…it really challenges you to keep focused to the holistic nature of it.* ***I.*** *Do you think that's part of it? Just having it be something that's on your mind?* ***P.*** *And to have uniform screening tools that really guide us in what to ask. And then the fact that [we] can put the information into a database so that we get an objective measure is great. Because you're really helping us with something that's really subjective, and so I think that the screening tools alone…they're really helping…I mean today it obviously paid off.* – **Average** uptake school-based health center, pre-K through 6th grade

Nearly all interview participants named mental health screening and assessment as a change that they undertook – typically during early stages of the LC – that in the case of "average" and "leading" practices supported positive service and client outcomes. They said that small changes, when judged to be successful, gave them a sense of "positive affirmation" to take on still-larger practice transformation tasks. The task of incorporating these technologies into office visits also spurred lasting changes to office workflows and opened up conversations about mental health.

> *We use the SDQ [Strength and Difficulties Questionnaire], it's a great tool to have in our office. It's been very beneficial, I think we don't realize the little things that patients don't say because they only have the 30 minutes in the office. So when you pull it up and you see, you know the kid is having trouble with making friends at school, it's not that he's being bullied, it's not that he has a behavioral issue, maybe it's a social issue, you know, and being able to address those concerns is really nice. We're saying you know, we want you to come back in a week and we're going to go over the rest of the stuff that we found at the visit…I think the SDQ kind of opened our eyes as a practice to, well, we constantly follow up with patients but now we're following up with them on a more consistent level.* – Medical assistant, **leading** small suburban pediatric practice

New technologies was not enough to spur change in practices that lacked cultures and climates that were conducive to bring them to scale, such as all-staff participation and individual staff autonomy to be a change agent. For example, a physician from one of the practices that dropped out said that he creased a patient registry and medication sheet within the medical

records, however he was the sole person using them. Another physician at a large rural practice that "lagged" in the program lamented that office staff had begun routine screening – something physicians were aware of but not following closely – and it was weeks before anyone realized it was having a "negative effect" on staff time and could make adjustments to the processes.

Challenges in identifying tools that fit clinicians' communication styles and the populations served was named as a primary barrier to uptake of screening technology. Staff from "lagging" and "drop-out" practices described challenges using the recommended tool, with one participant saying "it's not the right screen for our patients at all" and another saying that it had poor sensitivity, whereby "none of [the families I screened] said that they were having problems." Others from "average" and "leading" organizations displayed more flexibility and persistence, networking with other practices to identify alternatives and trialing them through Plan, Do, Study, Act (PDSA) cycles until a good fit for their communication style and population was found.

> *We had been wanting to do [screening] for a long time, but BMW gave us the tools and the impetus to kind of just do it. [We were] helped by other offices knowing what screening tools they used and, you know, we had a pool to pull from, basically…We needed to do a few PDSAs, just simple ones, to kind of see where we are and where we're going and…through the PDSAs I could see the benefit and I could see, you know, our change did work…but it was, initially, a difficult topic to start – you know the screening process, just from scratch and never having really done this before…but once we got it instituted, it worked very well.* – Registered nurse, **leading** suburban pediatric practice

Other barriers to the uptake of screening and assessment reported were lack of computer technology and in turn difficulties with efficiently capturing and reviewing individual screens, monitoring patient progress over time, and visualizing and making sense of outcomes data. "The biggest hindrance I would say is that the technology for us in our office is not where it should be," said a physician from a lagging rural pediatric practice. "There is a lot of running out of the room to go find the questionnaire, then having to come back and score it."

Built Environment and Wayfinding

While only a handful of staff brought up the topic of their built environments, there was some mention that an environment conducive to teamwork and communication was important to uptake. Contrast, for example, the following quotations from colleagues in the same practice:

> ***P.*** *A small group of us participated. I wish there was more participants but I didn't think everyone knew what exactly it was…I only knew just because of the doctor I work for. He told us. But we have two floors of pediatric nurses.* ***I.*** *Oh that makes it tricky. Actually I went upstairs first looking for you, so I can see how it makes communications harder.* ***P.*** *It makes it harder communications-wise.* – Medical assistant, **lagging** rural pediatric practice

> *When they told me you were interviewing [the nurses], I didn't know the nurses were involved, really. Actually I didn't realize that.* – Physician, **lagging** rural pediatric practice

The physician also said she was unaware of the new technologies and processes that the medical assistant said they had instituted since the start of the collaborative (e.g. community resource directory, new procedures for collaborating with schools). This disconnect across the pediatrics team arose from what the physician went on to describe as a "fractured" department, which she said was a result of both the social climate and the built environment.

Contrast this with narrative from a "leading" large pediatrics practice located inside a series of contiguous office buildings. The facility felt corporate and antiseptic until one walked into the waiting room, where there was a fish tank and colorful walls; the offices reflected the social climate of an engaged staff who worked closely as a team to create a therapeutic environment. Visual cues had helped create awareness – important, said the physician interviewed, given that his patients didn't think of pediatrics as a place where they could talk about mental health.

> *One of the recommendations was to put a flier – a poster – in the waiting room. OK, so we put it – so OK fine – that was one of the low-hanging fruit. They wanted us to put a poster in the waiting room. 'OK, here's your poster.' Check [made sound like smacking poster on a wall]. We get that one [laughing] we're ready for the home team. Um, and by god, it was only like two or three days into it, I'm doing a check-up and mom asks: 'What's with the poster that says don't forget to ask about my behavioral development?' And I think oh, it's funny, I didn't think anyone would ever read those things [laughing]. So, so we talked a little bit...I was amazed that folks looked and processed in those terms.* – Physician, **average-uptake** small suburban pediatric practice

Other practices named elements of the built environment when asked about changes they'd made to systems or procedures since the start of BMW, emphasizing how it improved the overall quality of patient-provider communication.

> ***I.*** *Since the start of the collaborative, what are some of the changes you guys have made to some of the systems or procedures for caring for patients? If you were to point to a couple of the biggest changes.* ***P.*** *Hmmm. Changes. Well, I think sometimes, um, even how the room was set up: Was it conducive to talking with a patient? That was one thing that we looked at. And they did a little bit of rearranging, that type of thing.* – Nurse practitioner, **leading** family medicine practice affiliated with community action organization in urban area

Discussion

Organizational behavior theorists have called upon public health practitioners to develop practice change interventions that are theory-based and address relevant factors operating at multiple ecosocial levels (Grol et al., 2007). This exploration of in-depth qualitative interviews contributes to current efforts to implement mental health services in pediatric primary care and family medicine by demonstrating how this call to action may be practically applied to a Learning Collaborative (LC) intervention. Participants in BMW Wave III identified **ten key aspects** of organizational context that they perceived as determinants of their practices' progress in the LC, changes to which supported their own application of new knowledge and skills (**Table 3.2**).

When staff spoke about their organizational culture, they focused on the key roles that **project leaders and champions** played in prioritizing BMW and overcoming resistance. **All-staff participation and teamwork** were in turn described as not just important, but also necessary to uptake. These findings imply that two approaches to culture change – one more top-down focusing on *commitment of leadership* (Schein, 2010) and another more bottom-up focusing on *large-scale, real-time engagement of a representation of staff from all levels* (Kusy & Holloway, 2014) – may both be important to implementing primary care practice change. Practices might also benefit from LC components to strengthen temporal leadership, which Maruping et al. (2015) found is a determinant of whether staff respond positively or negatively to

perceived time pressure. Leaders might be coached to aid in "task pacing" through "the scheduling of key milestones ahead of task deadlines, synchronizing team members' inputs and outputs, and allocating temporal resources to ensure there is adequate time to accomplish team goals" (Maruping et al., 2015, p. 1318; Mohammed & Nadkarni, 2011).

A major barrier to participation was a climate in which staff felt overburdened and short on time. **Lived experience and a sense of mission** arose as motivators to implement BMW in the face of these disincentives, with non-physician and non-managerial staff emerging as change agents. These findings suggest that primary care and family medicine practices engaging in mental health implementation would benefit from looking beyond the "typical" leaders when electing a project champion, given the value of lived experience and the ability to engage strong social networks in successful uptake. This is corroborated by research on organizational readiness for change, which demonstrates that intrinsic motivation can provide a strong incentive for primary care transformation (Wise, Alexander, Green, Cohen, & Koster, 2011).

Where **cultures of mental health** existed, they seemed to be to some extent organic and to some extent nurtured through BMW, with participants describing a change in "focus" and "attention" to "whole health" and "wellness." Intervention components that were designed to facilitate culture change included completion of an Office Inventory to promote cultural awareness and identify priorities; development of practice "storyboards" and SMART aims; participation in a Learning Session; and strategies for building a therapeutic environment – such as engagement, relationship-building, and influence – developed through on-site academic detailing sessions. Where interviews suggested these components fell short was in the lack of emphasis on developing a **therapeutic social environment** for staff. Edwards & Karnilowicz (2013) have suggested that caregiving occurs within relational contexts (where child feels safe, staff have support from colleagues), organizational contexts (structures and cultures attuned to client and staff needs such as trust and containment), and systems contexts (emotional impact of fragmented systems on children and staff). While their "ecological model of therapy" parallels

BMW's focus on individual, organization and inter-organization factors, it differs in that it "integrates the children and therapists' experiences and needs" and "emphasizes their interdependence" (p. 327). This perspective might inform future interventions, not only to support the health wellbeing of staff engaged in emotional work, but also as Lasserre (2010) suggests, because how "physicians and leaders treat and serve their peers, colleagues, and employees serves as a model for how the team treats patients and their families/caregivers" (p. 168).

Successful practices **minded the bigger picture** from the start of the LC, developing an implementation plan that fits BMW activities among larger institutional goals and strategies. There was evidence that BMW challenged the accepted **configuration of workflows** within a practice, serving as a catalyst for staff to clarify their roles in mental health promotion. They reported that these changes were essential to implementing mental health services in a reliable, efficient, and sustainable way. Narratives suggest that practices would be well advised to consider the timing of their participation to coincide with any more global transformation efforts, such as attaining patient-centered medical home or accountable care organization status. Narratives also suggest that LCs provide coaching and tools to support staff in mapping out and realizing new office workflows and facilitating what Currie & White (2012) call "brokering" of mental health knowledge across roles. This could be particularly useful, for example, in planning how individuals will work together in facilitating mental health screening, brief intervention, referrals, follow-up communications, and outcomes monitoring, to the benefit of children and families.

Technological changes such as enhancements to the **built environment and wayfinding** and uptake of new **mental health screening and assessment tools** supported awareness of BMW and ongoing application of new mental health communication skills. Staff mused over the unlikely role of small changes such as exam room set-up and marketing materials in promoting staff-patient interaction and serving as a reminder of mental health. These findings are supported by behavior theory that points to the role of visual cues in the conditioning of new behaviors (Martin & Dubbert, 1984) and by research showing that evidence-based building design can

promote patient-staff interaction (Brooks & Griffin, 2010) and foster more therapeutic environments for patients and staff (Callahan et al., 2014). Participants described screening tools as particularly helpful in instituting a process for following up with patients consistently. However, they needed ample assistance in choosing among screening and assessment tools (e.g. general vs. disease-specific), collecting and visualizing outcomes data, and creating spaces for staff to come together to debrief, reflect, and share successes. Many emphasized the practical use of these tools in applying new "common factors" communication skills – they saw them not just as tools to screen and inform accurate diagnosis, but also as conversation-starters and "guides in what to ask." The pervasive observation that small technological changes spurred social change in complex and sometimes unanticipated ways is congruent with sociotechnical theory, which suggests that organizations consist of interdependent technical (e.g. computer equipment, screening tools) and social systems (e.g. staff, teams, departments) (Burke, 2014). As Hamilton, Orr, & Raboin (2008) wrote in proposing that health care organizations address culture and built environment in tandem, "sociotechnical theory promotes joint optimization of the social (culture) and technical (facilities) aspects of an organization to achieve sustained positive change" (p. 40).

Over a century of organizational behavior and theory research has demonstrated that institutional and market forces are co-determinants of adoption, implementation, and sustainability of organization change. To this end, narratives reveal that having an implementation strategy in place is important, but not enough to be successful when integrating mental health care into a climate of **time constraints and role conflict**. In some cases practitioners were resistant to the prospect of treating mental health within the context primary care. This is congruent with evidence that while pediatricians can treat common conditions with good outcomes and reduce stigma through a focus on whole health (WHO, 2008), many feel unprepared to engage in diagnosis and treatment (Boreman et al., 2007; Green et al., 2014) or believe it is outside of their scope of practice (Heneghan et al., 2008). Successful practices were highly group-oriented and led by those with intrinsic motivation to "bridge the gap" that exists

both physically in terms of mental health resources and paradigmatically in terms of resistance to shifting mental health tasks to the primary care and family medicine setting. One might argue that it is the undercurrent of market incentives against which institutional changes operate – including policies and payment models that place unequal value on physical and mental health – that is responsible for the strength and frequency of these themes (Mauch, Kautz, & Smith, 2008; Meadows, Valleley, Haack, Thorson, & Evans, 2011; O'Donnell et al., 2013). As Herzberg, Mausner, & Snyderman (1993) suggest, where poor climate and perverse incentives exist, the "motivation to work" is necessarily intrinsic. Gershon et al. (2004) have suggested that it is vital for organizations to articulate their cultures "through both word and deed" (p. 38). They found that if staff aren't given the tools needed to meet organizational expectations, then "regardless of the cultural message espoused, the 'real' message will be communicated." Such findings were corroborated by a recent study of mental health service implementation in schools. Langley, Nadeem, Kataoka, Stein, & Jaycox (2010) described barriers as competing responsibilities, difficulty engaging parents, and lack of support from administration, and found that successful implementers had a strong professional networks, funding, and clinical consultation available.

In conclusion, while narratives strongly suggest that LCs can support mental health implementation through organizational context change, market forces present a formidable challenge to success, particularly among providers serving impoverished and rural communities. Taken together, narratives of BMW Wave III participants underscore how interventions to implement mental health services in primary care should ideally address individual-, team/unit/organization-, *and* community/region/state-level determinants.

Table 3.2: Organizational context themes with quotations representative of 'leading,' 'average,' 'lagging,' and 'drop-out' practices

Organizational Culture	
Project Champions and Support from Senior Leadership	We have to keep reminding the staff or making sure that they understand that [it's] really important to me and to the practice. Because there's so many things we have to do, if I don't take an interest in what we have to do, then it falls by the wayside…So we have staff meetings, and I keep asking: 'So where are we at in the SDQs? We're supposed to be following up. Who'd you get to follow up?,' you know, and 'Well, we're having this problem or that,' and then we contact somebody…Whatever you do, you just have to emphasize how important it is and then follow up and make sure they're doing it. – *Physician from small suburban **leading** uptake practice (CVF: 29% group, 23% rational, 21% hierarchical, 27% developmental)* Well to a large degree when you have just a couple medical assistants, it's just really hard if you don't have uniform buy-in, you know? So how do you take doctors who are generally all hard-headed and have their own agenda, how does everybody come together and say 'well this is our project.' And maybe that's a leadership job that I have not been able to overcome. – *Physician who supervised residents at urban hospital-based family medicine practice that **dropped out** (CVF: 54% group, 18% rational, 11% hierarchical, 17% developmental)*
All-Staff Participation and Teamwork	**I:** So do you think it's been helpful to have all roles involved, versus just having the physicians involved?" **P.** You have to. Absolutely. And, you know, the role that [name redacted] has played…her leadership with some of the front desk staff, as the coordinator, she pulls them into it… and everybody works here because they care about [mental health], but I don't know if before the Collaborative and the exercises we went through that we actually got, everybody got that message and was communicating it in the same way. In the beginning I sold the Collaborative short a little bit in saying no, but I was kind of saying in the beginning we had the stuff together, we just didn't kind of centralize it. And when you talk about things like that for a long-enough period of time, it gives people…time to ask questions, to clarify, to express frustrations that they have with certain situations, not that all of those are smooth-sailing now, but everybody knows, like this is what we value, you know, we're gonna help you address this. *– Physician from **leading** practice w/ a relatively balanced culture type (27% group, 26% developmental, 24% rational, 23% hierarchical)* So I came back on that Monday, sat down with the office manager, said 'I don't know how this is going to work. There's a lot that has to happen.' And fortunately we had a lot of support. So the other partners were behind me. The office manager was behind me. And the rest of the staff really bought into it. Our receptionists were particularly, ah, enthusiastic. The nurses just took the football and ran with it. One of the things they did immediately was – [laughs] one of the nurses just took it upon herself…she was done working even…she just picked up the phone [and] cold-

	called every psychologist in the area and asked eight questions. You know, are you accepting new patients, do you see pediatrics, what's your area of focus, what insurance do you take. She created this binder. She just did this on her own! [So] fortunately I had a lot of buy-in from the office. If I didn't have that, then it wouldn't have worked. No question. *– Physician from suburban **average** uptake practice (CVF: 38% group, 31% hierarchical, 17% rational, 14% developmental)* I think that there was some interest in being involved, but again when it seemed that the first thing we had to do was 'I need for you to get these questionnaires,' and it didn't seem like there was learning going on right away, we lost buy-in…So we lost the steam. And we lost the collaboration…I wish we could of had more participation from the other providers here because I think that they would have benefited from it. *– Physician from urban **average** uptake practice with a predominantly group (68%) culture type (14% developmental, 12% rational, 5% hierarchical)* **I:** Well tell me a little bit about the practice here. So have other staff members been involved with BMW? **P:** No. It's such a small practice that it's just me. **I:** OK. **P:** So that's, you know, that had been one of the hopes I know of the program. It doesn't work here for a variety of reasons. One, we're very small. Two, I'm not the owner or partner. I'm an employee. And I'd say my partners aren't really interested in this, so...you know. There wasn't really any opportunity for anyone else to get involved in this. *– Non-managing physician from suburban practice that **dropped out** (CVF: 29% group, 33% hierarchical, 24% rational, 14% developmental)*
Lived Experience and Mission-Driven	And you know I personally can say this is something I've dealt with. I use personal experience, which I think is easily relatable, and I know a couple of the other girls who work here do the same, we all use personal experience, you know, and I think when you give them a little bit of yourself, it makes it easier for them to open up about them. I talk about my family here, I let them know you know 'I have children that age. I have seen this happen to my son.' You know or 'I've seen this happen to my niece or nephew.' It does happen. You know and just 'You're not the only one. You're not the only parent. Let me tell you, there are 15 people on your block who are going through the same thing,' or whatever it may be, without giving away any personal information. I think a lot of it is testimony. *– Medical assistant from **leading** practice with a predominantly group (54%) culture type (21% developmental, 13% rational, 12% hierarchical)* I have [a] special kind of affinity toward teenagers. I have two teenagers, so – and I've always liked that age group, and it seems like that's the age group that the mental health issues hits the most. And so I've always had sort of a soft spot in my heart for the teenagers, you know, and when the families call [and] they are concerned about their teenagers, and some of these parents are tearful…I just have a soft spot in my heart for that, and so it's really tapped into my compassion for them...It's really affected me, and like I said, I really enjoyed hearing [BMW staff name redacted] talk and I just felt this passion for this program. I liked being involved in it. *– Registered nurse who had*

	*been at a suburban **leading** practice with predominantly group (44%) culture type (21% developmental, 20% rational, 15% hierarchical) for 16 years* It's not something I would like to do, I would definitely prefer to do mostly clinical pediatrics, but as my practice ages into more of a teenager/adolescent population, and as there are less mental health providers, we end up prescribing and seeing more of them. – *Physician from rural **lagging** practice (CVF: 32% rational, 27% group, 27% hierarchical, 14% developmental)*
Building a 'Culture' of Mental Health	**P.** [You] guys have kind of tuned us in a little bit more, paying attention to the patients coming in. The physicians, the nurses, I think again, the fine-tuning, they're focusing a little bit more on that…staff members talking to each other, like someone notices someone coming in, now we rely on each other, like: 'Hey you know, it seems like Susie's a little bit more than sick. Like something might be going on at home. Like maybe you want to talk to them about it.' **I.** So everyone kind of has it in the forefront of their mind and sort of communicating about it. **P.** Yeah, it's becoming a bigger thing for us to focus on. – *Member of billing/coding staff at small suburban **leading** practice with relatively uniform distribution of points on the CVF (28% group, 28% developmental, 23% rational, 21% hierarchical)* I think that with the training we're much more aware of when there may be a problem or something underlying going on in the family that we may be able to help with. Which we, uh, may not have picked up on before, because I think we're better tuned in [to] identifying the possibility that there may be [an] issue that may be going on…I think that probably we would identify a problem or need and we would be more apt to say, um, that's more the realm of the psychiatrist. And now we probably take a little bit of a different approach that, here are some things that we may be able to suggest [or] do [other] than just strictly the referral. – ***Leading** practice w/ predominantly group (45%) culture type (20% hierarchical, 18% developmental, 17% rational)* I think we've created…we've made our own bed. So we didn't have much to offer for behavioral health. So folks I think over – and this is like years and years and years, decades, of evolution – they just learned 'don't bug the pediatricians with those questions, because there is nothing they can do for you.' – *Physician from **average** uptake practice (CVF: 38% group, 31% hierarchical, 17% rational, 14% developmental)* I'm more interested in mental health than I was before, just because you know, when you think about it at first you're like oh, I don't want to deal with those…we see a lot of [provider name redacted], which is a network for troubled youth…and I just, now I'm more compassionate for them because I know they, they just need some extra patience and they just need that extra, you know, just to be calm with them and take a step back so now I'm just more, even more interested in the mental health. – *Physician assistant at large rural **lagging** pediatric practice with a relatively uniform distribution of points on the CVF (32% rational, 27% group, 27% hierarchical, 14% developmental)*

Organizational Structure/Processes	
Minding the Bigger Picture	It's also about shared goals. And I think part of what made the Collaborative successful was that it gave us tools to address things that also hit on our institutional mission or institutional goals. [It] fit nicely into how we think about all of the other things that we have going on in our office. And so in that sense it makes it easy. It's not like reinventing the wheel. We're not starting over. We're fitting this piece into the rest of everything else that we're doing. *– Physician, manages/supervises, at **leading** urban pediatric practice* I don't know, it's tough, and everything moves super slowly here in the school. You've got a lot of people with different agendas, I mean yeah we all want what's best for the kids in the end, but everybody's got their own organizations that they're working with and their own rules and their own barriers and so it becomes challenging. *– Nurse practitioner, managers/supervises, at **average-uptake** school-based health center, grades pre-K to 8*
Formalizing Roles and Reconfiguring Workflows	They [the staff] got involved, you know, particularly early on…we threw around the words or the term BMW. They had no idea – they thought we were bringing a new car in or something! So they got to learn [what] the program was about [and] where they could fit in. A lot of them…were doing like screening things or different areas that, you know, they could kind of see how, why this would be important. And it gave a little more credence to what we were doing…Going back to the beginning when we were first going to the initial session and we had to prepare our [storyboard]. So you know we got people involved in that. Got some different ideas. And I think they could kind of see it and, you know, it continued to kind of define what their roles are in this process. *– Physician from **leading** large rural pediatric practice* Well we have regular meetings, but you know specifically, for example when we were doing asthma, we had specific meetings for the asthma…but we haven't done that with BMW yet. And we need to do that…you know again what we haven't really done is sit down and talk about what the value to us has been and make some systemic changes and um we really need to do that. *– Physician from **lagging** suburban pediatric practice*
Organizational Climate	
Time Constraints and Role Conflict	You go in a room and it's, you know I'm seeing the kid for an earache and it's, you know, the 'oh by the ways.' OK. 'Oh, by the way, he's acting out in class. He's being kicked out of day care…' And you're going: 'Oh my gosh. This is a ten-minute appointment, I've got three patients waiting, and you want to talk about behavior.' That's where we need the help. OK, now can a screening tool help you? Yeah, but by the time I've given the parent the screening tool, they fill it out, I sit there and wait, OK, then I score it, then I'm five patients behind. OK? It's just, it doesn't work in terms of the flow, and our patients have transportation issues, so it's not like I can say 'let's come back in for any other

	appointment.' They had to arrange transportation to get there, and they pulled the kid out of school. So they may not be able to do that again. – *Physician, does not manage/supervise, at **average-uptake** urban community primary care health center* You know the way the schedule goes in a typical pediatrician's office, just doesn't allow for these long conversations about mental illness and things like that and, you know, it's obviously so common, so it needs to. But, you know, for the most part, it was just wanting to help but not feeling able to as much as we would like to. – *Registered nurse, manages/supervises, **leading** suburban pediatric practice*
Therapeutic Social Environment	**P.** Because we have to do vaccines, and some people, they get very, yeah, so we just have to know you can't keep approaching them and you just have to give them a few minutes to relax. So cuz things do get violent in here. **I.** Have you noticed a difference now that people are applying what they learned in the Collaborative? **P.** Yeah. Things have gotten a lot, we don't have to use security as much…I mean before we would have them on stand-by quite often, but it doesn't have to be an issue. – *Physician assistant, manages/supervises, **lagging** rural pediatric practice* I think one of the challenges of the job, the role that we play in people's lives, is that we're crisis managers and so we don't always really get to see the success stories. You just see the ones that don't work out. Like if your advice works and you do the right thing and like people probably don't want to come back and see you…and so it's hard, it's really hard to get that kind of feedback, to say you transformed a child who was, you know, really failing school to a child who's now getting Bs. Or that you really turned things around in a huge monumental way, I think of them more as little small-step successes…And that's just primary care in general. [You] don't really realize the impact of seeing that child ten times in their first ten years or the impact of giving them a book. I know that that exists, but have I seen it make a measurable impact in my families [sighs and pauses]? Some yes. – *Physician, manages/supervises, **leading** urban pediatric practice*
Organizational Technologies	
Screening and Assessment Tools	Two years ago is when we started. They had those certain drivers that you had to try to choose a couple to work on and then kind of progress through. So we focused on the screening tools the most. [It] kind of got everybody on [the] same board, what are we doing and are we asking the same questions and are we documenting them…so from last year to this year, that has become just part of our practice. We have it automatically that we give out those screening tools and they're all in the treatment rooms [and] entered into our electronic system. – *Office manager, **leading** urban hospital-based pediatrics department* What would be really great is if there were some sort of online questionnaires that the patients can do themselves and

	they can bring it to you scored…If we could just give them an iPad to answer the questions and they scored them as they came through that would be helpful. [As] technology improves then hopefully identification [and] treatment management will improve too…The biggest hindrance I would say is that the technology for us in our office is not where it should be I think for where technology is in the world. I mean I really should be able to sit with someone like this and then be able to pull up on some device the questions, let them do it, come back in and talk about it. Instead there is a lot of running out of the room to go find the questionnaire, then having to come back and score it. *– Physician,* ***lagging*** *rural pediatric practice*
Built Environment and Wayfinding	There are some visual things that we've done around the office to allow for that reminder [for staff and patients to discuss mental health]. [Llittle reminders can come from people, they can come from systems, they can come from electronic records, they can come from the fact that we put folders on the wall that has all the screening materials and all the tools right at hand, and so you're more likely to use them. And everybody is going to kind of use those tools in a little bit different way. As silly as it sounds, I mean it's a big decision in the beginning, like do we print the BMW in color…Black and white is much cheaper but color stands out and it reminds us [to] look at it. *– Physician, manages/supervises,* ***leading*** *urban hospital-based pediatrics department* ***P.*** We're a very fractured department." ***I.*** "Because of the physical layout?" ***P.*** "Yes, because of the physical space, *so…* and because of some personalities, *but* [laughing]…and also because we're low on staffing *– Physician, does not manage/supervise,* ***lagging*** *rural pediatric practice*

CHAPTER FOUR: MANUSCRIPT THREE

Ohio Building Mental Wellness:

Implementation, Service, and Client Outcomes of a Statewide Intervention to Implement Mental Health Services in Pediatric Primary Care

"The first five years have so much to do with how the next 80 turn out."

- Bill Gates

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Abstract

Background. Mental health is the most common concern that families bring to pediatric primary care providers and the leading cause of childhood disability in the United States. There have been little to no changes in rates of identification, diagnosis, and treatment of mental health conditions in pediatrics over the past decade, making the development of effective interventions to support these changes vital to child health outcomes. While interventions to train individual clinicians have proliferated, research on the effectiveness of complex interventions that address both individual and organizational determinants of mental health promotion are lacking.

Methods. The Ohio BMW Wave III Learning Collaborative was a complex intervention in which 29 hospital-, school-, and other community-based pediatric primary care and family medicine practices were engaged from 2013 to 2015. We undertook a quasi-experimental pre-post analysis of the effects of the intervention on clinician confidence, clinician attitudes, and "organizational context" for mental health services (*implementation outcomes*); mental health service delivery, diagnosis, and prescribing patterns (*service outcomes*); and improvements in symptoms and function for children/youth with actionable mental health concerns (*client outcomes*).

Results. All 26 practices that completed BMW engaged in Breakthrough Series and four on-site academic detailing sessions and measured advancement in one or more of the following areas: resource tracking, mental health promotion and screening, integrated planning and implementation, and practice-based interventions. Uptake of online modules was comparatively low. Staff reported significant improvement in perceptions of organizational context (culture, structures/processes, culture, climate); attitudes relating to the impact of mental health care on workload and time; and confidence in using "common factors" and "common elements" skills. Robust improvement in inter-rater agreement on organizational context domains was also seen. Rates of mental health diagnosis increased 1.92 percentage points (95% CI: 1.59 to 2.26, p=0.000) from 8.30% in the six months "pre" to 10.2% in the six months "post" and significant

increases were also seen in the proportion of children/youth diagnosed with disruptive behavior (p=0.001), ADHD (p=0.000), or depression/anxiety (p=0.000) conditions. Rates of typical antipsychotic prescribing by BMW clinicians decreased 37% (p=0.0379) and stimulant prescribing by BMW clinicians increased 9% (p=0.0078). Rates of prescribing of potentially contraindicated medications for bipolar disorder and disruptive behavior stayed the same. SDQ symptoms scores improved an additional 0.981 points (95% CI: -1.90, -0.060) from 0 to 3 months and 1.30 points (95% CI: -2.75, 0.160) from 0 to 6 months for Cohort 2 as compared to Cohort 1. ***Conclusions.*** Overall, this study provides initial evidence that a complex intervention addressing individual and organizational factors in tandem may be effective in achieving mental health service implementation in pediatric primary care. Future research should explore the mechanisms by which organizational context and staff consensus moderate/mediate intervention outcomes.

Background

If all children had check-ups with primary care providers engaged in mental health promotion, the result would likely be communities where mental health is regarded as part of whole health, families feel better supported, and more youth transition into healthy adulthoods. Primary care providers are in a unique position to collaborate with schools and other community organizations to prevent mental illness and support recovery, and there is evidence that they can do so with good results (WHO 2008). Yet well child visits continue to fall short in addressing the psychosocial concerns that are key drivers of adult disease (Coker et al., 2013). Many pediatricians feel unprepared to identify, diagnose, or treat mental conditions (Boreman et al., 2007; Green et al., 2014). Results of a survey conducted by the American Academy of Pediatrics found little to no change in these practices over the past decade (Stein et al., 2015).

This article describes findings of a quasi-experimental pre-post analysis of the effects of the Ohio Building Mental Wellness (BMW) Wave III Learning Collaborative on clinician confidence, clinician attitudes, and "organizational context" for mental health services

(*implementation outcomes*); mental health service delivery, diagnosis, and prescribing patterns (*service outcomes*); and improvements in symptoms and function for children/youth with actionable mental health concerns (*client outcomes*). We use the term implementation to suggest task-shifting, whereby primary care practices take on some tasks more traditionally in the domain of mental health providers, in addition to coordinating with other community organizations.

Ohio BMW Wave III was a complex intervention in which 29 hospital-, school-, and other community-based pediatric primary care and family medicine practices were engaged over a three-year period. The aim of the intervention was to achieve optimal wellness for Ohio children and families as soon as possible through an enhancement of mental health service delivery. It served as an opportunity to implement and evaluate a novel mental health intervention while at the same time exploring the role of "organizational context" as a determinant of successful implementation. "Organizational context" is defined here as attributes of the internal ("inner context") and external ("outer context") environments and inter-organizational networks in which health care providers operate (Aarons, Hurlburt, & Horwitz, 2011; Damschroder et al., 2009; Greenhalgh et al., 2004). The definitions of inner context are summarized in **Table 4.1**.

Interventions to implement mental health services in pediatric primary care vary in complexity from provider communication skills trainings (Wissow et al., 2011; Wissow et al., 2008), telephone and collaborative consultation (Epstein et al., 2007; Sarvet et al., 2010), and colloborative care (Kolko et al., 2014), which primarily target individual clinicians, to more fundamental transformation of care delivery using systems of care (Stroul & Friedman, 1986) and chronic care model (Wagner et al., 1996) approaches, which target entire organizations and systems. BMW Wave III employed components operating at all three (individual, organization, inter-organization) levels. Building upon Waves I and II (Baum et al., 2015), Wave III expanded its geographic reach through online learning and intervened with "organizational context" through all-staff participation in program components. New components included a revised version of the American Academy of Pediatrics (AAP) Mental Health Practice Readiness

Inventory (2010) described by King (2016a) and on-site academic detailing sessions informed by the work of Brown & Wissow (2012).

In this analysis, we use survey data to test the effects of the BMW Wave III intervention on implementation, service, and client outcomes, using the heuristic model of implementation research proposed by Proctor et al. (2011, 2009). Narratives from in-depth qualitative interviews, presented in a concurrent analysis by King (2016c), are drawn upon in the discussion to explain and validate findings. Our primary research question is whether the BMW Wave III intervention was effective in its aim of enhancing the delivery of, including the context for, mental health services in pediatric primary care. In a concurrent analysis (King, 2016c), we use survey data to explicitly test the role of organizational context as a moderator of these intervention effects.

Table 4.1: Nominal and operational definitions of inner organizational context

Culture	Shared values and associated behavioral norms and assumptions that explain "why" people behave the way they do in an organization (Schneider, Ehrhart, & Macey, 2013; Weiner et al., 2013)	Operationalized as (1) a six-item scale that measures cultural *artifacts* (e.g. "my coworkers are supportive of people facing mental health challenges") and *values* (e.g. "people in my practice value research relating to the importance of early detection and treatment of mental health conditions") (Schein, 2010) and (2) a 20-item application of the *competing values framework* (Kimberly & Quinn, 1984; Quinn & Rohrbauch, 1981, 1983; Shortell et al., 1995)
Structure / processes	Specialization, standardized policies and procedures, and configuration of roles and authority within an organization (Pugh, 2007). To emphasize that structure encompasses planned sequences of events in health care delivery, the word *processes* is appended to *structure*. Inter-organizational networks, which give rise to shared norms and bridging social capital for organizations (Damschroder et al., 2009; Greenhalgh et al., 2004), may be considered outer context, but are categorized here as structures insofar as community linkages and decision support map to the CCM.	Operationalized as an index of 15 items indicative of the presence or absence of structures (e.g. "my practice has staff roles assigned to effectively monitor patients' progress…") and processes (e.g. "my practice coordinates with youth, families, schools…") supportive of mental health practice. Items were modified from the AAP Mental Health Practice Readiness Inventory (2010) and represent community linkages, delivery system redesign, child and family support elements of the CCM.
Climate	A composite of staff members'	Operationalized as a 10-item scale

	experiential descriptions of "what" happens within a practice and how it effects their wellbeing pfeff	that measures staff perceptions of climate dimensions identified by James & Sells (1981): role, job, leader behavior, workgroup, and organization
Technology	Built environment, tools, equipment, and other resources used by patients as they engage in health care and by staff as they carry out functions such as screening and diagnostic testing, care coordination, health information management, and way-finding	Operationalized as an index of 5 items indicative of the presence or absence of technologies (e.g. " I use psychosocial history and validated screening and assessment tools…") supportive of mental health practice. Items were modified from the AAP Mental Health Practice Readiness Inventory (2010) and represent decision support elements of the CCM.

Methods

Building Mental Wellness Intervention

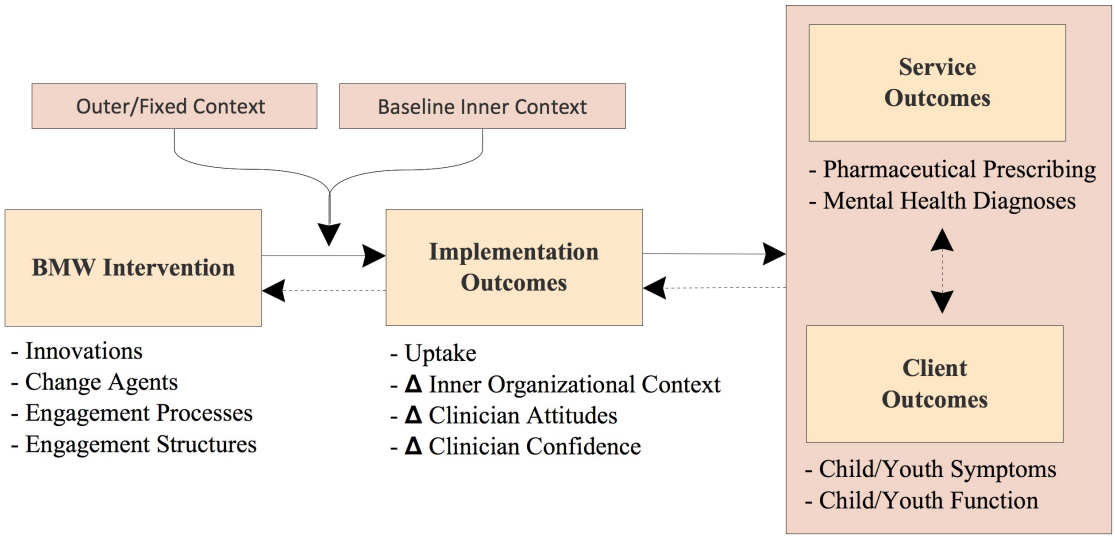
Ohio BMW Wave III was a statewide learning collaborative coordinated by the AAP, Ohio Chapter. The goal of BMW was to support both clinical and non-clinical pediatric primary care staff in implementing mental health services and achieving positive child/youth health outcomes. Twenty-nine practices engaged in the multifaceted intervention from September 2013 through August 2015, each participating in a package of strategies to bring about change at the individual and organization levels (**Appendix D**). The Chronic Care Model (Wagner et al., 1996) and AAP core competencies for pediatricians informed implementation outcomes at each level. Change agents involved in the intervention included pediatric practices, government agencies, and the core BMW implementation team, inclusive of physician, AAP, and research staff. Pediatric practices were recruited by the AAP Ohio Chapter, who circulated general information about BMW to members at meetings and through mailings. Interested practices were invited to participate in a conference call to learn more about the aims and strategies of BMW. During these calls, the core BMW team outlined what practices could expect during the first few months

should they decide to participate. This included forming an improvement team, identifying aims, completing an Office Inventory, preparing a storyboard, and registering for a Learning Session.

Research Design

Ohio BMW Wave III is itself a quality improvement initiative, but components of its evaluation were approved as human subjects research by the Nationwide Children's Hospital IRB (IRB13-00397) and form the basis for this study. Proctor et al. (2011, 2009) put forth a theory for implementation research that, modified to reflect ideas proposed by Owczarzak et al. (2014), the National Coalition for Dialogue and Deliberation (2005), and Wilson (2004), form the skeleton framework into which our conceptual model is nested (**Figure 4.1**). Quasi-experimental baseline and post-intervention analysis of survey data was used to evaluate the effects of the intervention, hypothesized to bring about change through **implementation outcomes** (e.g. uptake inclusive of integrated models of care delivery), **service outcomes** (e.g. mental health diagnosis and prescribing patterns), and **client outcomes** (e.g. symptoms and function). Qualitative in-depth interviews with 24 participants from 18 practices, described in a concurrent study (King, 2016c), complement this analysis and are drawn upon in the discussion.

Figure 4.1: Conceptual model of the role of organizational context in BMW practice change



Data Collection

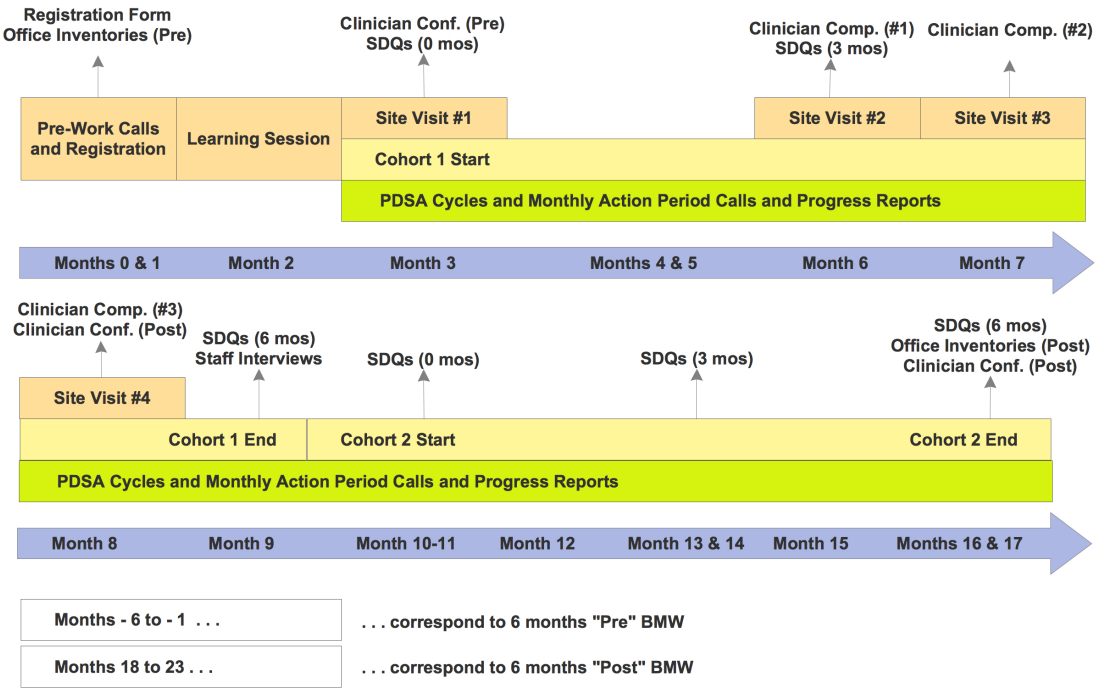
A flowchart illustrating a single practice's progression through BMW Wave III and the sequence of data collection is presented in **Figure 4.2.** The AAP undertook statewide recruitment and conducted pre-work conference calls with practices expressing interest in BMW Wave III beginning in October 2013. Twenty-nine practices elected to participate and designated a practice lead to complete a **registration form** inclusive of elements of outer/fixed organizational context. Eleven of the 29 practices were school-based health centers from a single metropolitan area who reported their data collectively under one of three groups: preschool to 6th grade, preschool to 8th/12th grade, and high school only. This had implications for analysis, which with the exception of measures of program uptake, was conducted on 21 practice clusters.

Practices were asked to join one of three groups, each undertaking the same activities, but beginning a few months apart to allow the implementation team to dedicate adequate time to each practice. They began by participating in one of three regional all-day Learning Sessions, followed by a series of four on-site mental health communication and skills trainings. While Learning Sessions were attended only by a small representative group of staff, the first on-site training was designed for staff in all roles, and all staff were invited to attend the other trainings as well.

At each of these site visits, there was a 45- to 60-minute academic detailing session and opportunities for coaching to help translate new knowledge and skills into practice. All staff were asked to complete the (pre) **Office Inventory** (AAP, 2010; King, 2016a) inclusive of questions about inner organizational context and attitudes toward psychosocial aspects of care, prior to the first visit. This was completed online and was anonymous, save for identification of the practice to which the staff member belongs. Only those self-reporting as clinicians (i.e. physicians, physician assistants, nurse practitioners, and other clinical staff) were administered the version with questions about clinician attitudes and office technologies, which were specific to screening, diagnosis, and treatment of mental health conditions. Research staff shared blinded benchmarking reports with practice leads, highlighting relative strengths and areas for improvement, to help

leads guide staff in choosing aims for Plan, Do, Study, Act (PDSA) cycles. All participants were given access to **11 online learning modules**, including one on psychotropic medication prescribing, which could be completed at any point during the Learning Collaborative.

Figure 4.2: Progression of a pediatric practice through BMW Wave III Learning Collaborative



Children/youth ages 4 to 17 presenting for a well child visit during the month coinciding with the practice's first site visit were screened for participation in **Cohort 1** using the parent version of the Strengths and Difficulties Questionnaire (SDQ) (Goodman, 1997). Children/youth with a total difficulties score of 17 or above and a non-zero function score were eligible to participate. If the parent/caregiver agreed, the child/youth was enrolled and the SDQ was re-administered in 3 and 6 months. Screening continued until a practice achieved a cohort of 15 patients. SDQ data was available to the child/youth's clinician to support patient care and QI.

At the first site visit, which addressed engagement and screening, clinical staff completed a (pre) **Clinician Confidence Measure** relating to skills covered in the training. The remaining three site visits, which addressed other "common factors" skills and "practice elements," took place over the next six months. These were interspersed with three PDSA cycles and monthly action period calls that continued through the end of the Learning Collaborative. Practice staff completed **Monthly Progress Reports** of their progress and overall uptake of BMW. At visits two through four, each clinician took part in a role-play with a BMW staff member, who completed a competence assessment of the clinician's ability to demonstrate common factors skills and practice elements for low mood. This assessment was informally conducted to help solidify behavioral skills as opposed to quantify or measure competence. At the final site visit, clinicians completed the (post) **Clinician Confidence Measure**.

The month following the fourth (final) site visit, practices recruited **Cohort 2** and qualitative interviews were conducted with staff. When Cohort 2 was complete six months later, staff complete the (post) **Office Inventory** and a second (post) **Clinician Confidence Measure**. At last, Medicaid/OCHIP claims data for diagnosis and prescribing were collected for each BMW-enrolled clinician in the six months "pre-" and "post-intervention," with actual dates corrected to coincide with the months before and after his/her group's participation. Because BMW was an 18-month program, for each of the three groups, the same six months (seasons) were represented in the "pre" and "post" period. The start of the "pre" period for the first group was May 2013 and the start of the "post" period for the third group was March 2015; at this point all site visits and the vast majority of PDSA cycles and online modules had been completed. The deidentified claims data were obtained from the Ohio Colleges of Medicine GRC.

Description of Implementation Outcome Variables

Uptake: Activities undertaken to employ BMW were measured as a function of implementation in five categories: resources, tracking, screening, engagement and brief intervention, and

integration. Uptake was rated as a Likert item ranging from 0 to 5 (number of stars achieved) using the BMW Star Recognition System. Specifically, practices and their QI coordinators rated a series of 16 Likert-type items, corresponding to the five categories, on a scale of 1 to 4, where 1 is no testing, 2 is testing, 3 is implementing, and 4 is sustaining. When all activities for a category were rated 3 or 4, a star was achieved, and certificates were awarded to practices achieving stars in all five categories. One activity in the integration category is progression through the SAMHSA Standard Framework for Levels of Integrated Healthcare (Heath et al., 2013).

Inner Organizational Context: Items in three domains were measured on an ordinal scale where 1 is strongly disagree and 10 is strongly agree: **structures/processes** (15 items); **culture** (6 items); and **climate** (10 items). Scores were converted to a percentage, where the maximum possible score is 100% and the minimum possible score is 0%. Domain scores were in turn calculated for each respondent as an average of items completed for the domain. The Quality Improvement Implementation Survey (QIIS) II culture domain (S.M. Shortell et al., 1995), an application of the Competing Values Framework (CVF) (Kimberly & Quinn, 1984), was included in full as a measure of the percent of points assigned to statements representing "group," "developmental," "hierarchical," and "rational" cultural values. The final domain, **technologies**, was measured on a continuous scale of percent agreement with five dichotomous yes/no items. A referent-shift consensus model was used to aggregate individual scores on the culture and systems/structure domains to the practice level, and a direct consensus model was used to aggregate individual scores on the climate and technology domains to the practice level.

Inter-Rater Agreement: The $r_{WG(J)}$ index, developed for assessing agreement when a group of judges (staff) rate the same target (practice) on multiple parallel items (James et al., 1984, 1993), were used to measure within-practice IRA on each inner context domain completed by all staff (culture, structure/processes, climate) and calculate an average for each practice. The index represents the reduction in variance reflected if one compares the average observed variance in

staff scores across items to the variance one would expect if there were complete lack of agreement. It ranges in value from 0.00 (no agreement) to 1.00 (perfect agreement). Where IRA on a particular domain fell outside of the range of 0 to 1, a value of 0.05 was assigned to indicate lack of agreement prior to calculating practice-average IRA.

Clinician Attitudes: Clinician attitudes relating to psychosocial aspects of care were rated on a continuous scale of 14 to 70 using the Physician Belief Scale developed by Ashworth, Williamson, & Montano (1984) and modified by McLennan et al. (1999). They were also rated on a continuous scale of 8 to 40 using the beliefs and feelings subscale and a continuous scale of 6 to 30 using the burden subscale identified by McLennan et al. (1999).

Clinician Confidence: Clinician self-rating of confidence using "common factors" strategies for building therapeutic relationships with children/youth and families and "practice elements" for low mood symptoms was measured on a continuous scale of 1 to 4, obtained by averaging ratings across 21 Likert-type items. These items were rated 1 to 4, where 1 is very confident, 2 is somewhat confident, 3 is not very confident, and 4 is not at all confident. Scores were reverse-coded so that a higher score indicates greater confidence.

Description of Service Outcome Variables

Mental Health Diagnoses: Rates of screening and diagnoses for anxiety or depression, attention deficit disorders, bipolar disorders, disruptive behavior disorders, autism spectrum disorders, and intellectual disability / developmental delay (ID/DD) made by BMW-participating clinicians for clients having encounters at a BMW practice six month pre- and six months post-intervention were analyzed using Medicaid/OCHIP data (both fee-for-service paid claims and managed care encounters) obtained from the GRC. Encounters eligible for inclusion were those for clients who met any Medicaid eligibility criteria and were under age 18 (age groups defined: <6, 6-17, all ages) at the start of the reporting month. A list of diagnosis codes included for each class of

conditions, chosen to reflect conditions that are commonly seen in pediatric primary care and that were addressed in BMW online modules and on-site trainings, is displayed in **Appendix F**.

Psychopharmaceutical Prescribing: Overall rates of psychotropic medication prescribing by BMW-participating clinicians for clients having encounters at a BMW practice in the six months pre- and post-intervention were also analyzed using Medicaid/OCHIP data obtained from the GRC. Prescribing of each of the following 16 classes of medications was compared for clients with and without mental-health-related diagnoses in the six months prior to their encounter: tricyclic antidepressants (TCA), selective serotonin reuptake inhibitors (SSRI), first-generation typical antipsychotics, second-generation atypical antipsychotics (AAP), combination AAP/SSRI, monoamine oxidase inhibitors, anticonvulsants, mood stabilizers (lithium carbonate and lithium citrate), alpha agonists, stimulants and non-stimulants for attention deficit conditions, benzodiazepines and other anxiety, other psychotropic medications, and polypharmacy. A list of the generic medications included in each class is available from the author upon request. These agents were defined using the Mental Health Research Network categories operationalized by Hacker et al. (2014), with the primary difference being that dual-use drugs were not excluded for any reason. For clients prescribed dual-use medications ("other psychotropic" trazodone or mirtazapine, "other anxiety" hydroxyzine pam, "TCA" amitriptyline or nortriptyline, "alpha agonist" clonidine) or medications from the benzodiazepine or anticonvulsant classes, medical diagnoses (headache, enuresis, epilepsy, insomnia) in the past six months were obtained to understand whether prescribing was for so-called medical or behavioral health purposes or both and to identify use of agents not indicated for mental health conditions in children/youth. Prescribing patterns (indications and contraindications) for five groups of conditions commonly seen in pediatric primary care were obtained to provide additional detail for any changes in prescribing discovered: #/% of clients diagnosed with bipolar, disruptive behavior, autism spectrum, or ID/DD conditions who are prescribed atypical antipsychotics; #/% of clients

diagnosed with anxiety or depression conditions who are prescribed a selective serotonin reuptake inhibitor (SSRI); #/% of clients diagnosed with attention deficit conditions who are prescribed a stimulant, atomoxetine, or alpha agonist; #/% of clients diagnosed with bipolar or manic conditions prescribed an SSRI, stimulant, or atomoxetine; and #/% of clients diagnosed with disruptive behavior conditions prescribed an alpha agonist or atypical antipsychotic.

Description of Client Outcome Variables

Child Symptoms & Function: We used the parent-rated version of the Strengths and Difficulties Questionnaire (SDQ), a valid and reliable measure of behavioral and emotional difficulty in the U.S. general population (He et al., 2013) whose items form an additive scale (Goodman & Goodman, 2009; Lehmann et al., 2014). *Symptoms* was comprised of five domains (emotional symptoms, conduct problems, hyperactivity/inattention, and peer relationship problems, prosocial), each containing five items. Domain scores can range from 0 to 10, and the prosocial domain is not included in scoring. Thus, 40 points were possible for the *Total Difficulties Scale*. *Function* as comprised of 7 items that ask whether the respondent thinks the child/youth is having difficulties in one or more areas (e.g. emotions, concentration, behavior, getting along with others), and if so, whether these cause distress and the degree to which this distress interferes with home life, friendship, classroom learning, or leisure activities. Item scores can range from 0 to 2, and two items are not included in scoring. Thus, 10 points were possible for the *Impact Scale*. If in the first question the child/youth was reported as having no difficulties, the scale was scored 0.

Data Analysis

General characteristics of practices, including their inner context, distribution of points on the CVF, and degree of all-staff consensus on perceptions of *culture*, *climate*, and *structures/processes*, were reported descriptively at baseline. Blau's (1977) index of heterogeneity was used to measure the degree to which cultures represent a uniform balance of values on the CVF. For each implementation, service, and client outcome, descriptive statistics were calculated

using linear mixed-effects models of each outcome variable with no covariates and a random intercept for practice to account for clustering by practice and to assess the percent of total variation in score that was due to between-practice differences (ICC type 1). For inner context, within-class agreement (IRA) was also calculated to further justify aggregation of inner context variables to the organization level (Glisson & James, 2002; LeBreton & Senter, 2008).

Outcomes were modeled in three steps to lend support to the premise that the BMW Wave III intervention was associated with implementation, service, and client outcomes. To test the effect of the intervention on **implementation outcomes**, clinician attitudes, clinician confidence, and inner context were modeled as a function of time as a dichotomous variable, where "baseline" (0) is the reference to which "post-intervention" (1) is compared. The exception was uptake, which was measured descriptively, since there was no baseline against which to measure an intervention effect. To test the effect of the intervention on **service outcomes**, rates of diagnosis and prescribing by BMW-participating clinicians for clients having encounters at a BMW practice in the six months pre- and post-LC were analyzed using paid Medicaid/OCHIP claims obtained from the GRC. Finally, to test the effect of the intervention on **client outcomes**, improvement in SDQ scores for Cohort 1 (baseline) was compared to improvement in SDQ scores for Cohort 2 (post) by modeling improvement in SDQ score as a function of cohort (time).

Different statistical models were employed for outcomes measured at the practice and staff/client levels. For simplicity, linear regression models with generalized estimating equations (GEE) were originally to be used for all **practice-level outcomes** (even though differences in outcomes measured in the same practices at two time points could be estimated using simpler paired *t*-tests). Ultimately, service outcomes were measured at the LC level for all clinicians in aggregate in the six months pre- and post-LC, since at the time this dissertation was submitted, claims were not yet available at the practice level or by month. A two-proportion z-test was used to test the hypothesis of no difference in rates of mental health screening/diagnosis/treatment or psychopharmaceutical prescribing for clients with encounters in the six months pre- and post-LC.

Claims for somatic conditions were also not yet available, precluding our analysis of dual-use medication prescribing, to be incorporated at a later date. Inter-rater agreement was still modeled using simple bivariate linear regression of IRA on time. GEE with robust variance estimation was used to account for correlation between baseline and post measures (Liang & Zeger, 1986), and an exchangeable working correlation structure was specified.

All other implementation outcomes were measured at the **staff/clinician level** and client outcomes were measured at the **client level**. This data was analyzed in a way that accounts for clustering of individuals by practice, so as to obtain valid inferences. First, data visualization and ICC were used to assess degree of clustering. If between-practice variation was evident, outcomes were estimated using random (mixed) effects models. Although overlapping staff participated in the Office Inventory at baseline and post, there was no identifier connecting responses at each time point. Likewise, families who participated in SDQ Cohort 1 were different from those participating in Cohort 2 (no overlap). Thus, for clinician attitudes, organizational context, and child/youth symptoms, samples at each time were treated as independent. In models of clinician confidence, where clinician scores were linked from baseline to post, correlation between clinician outcomes over time was accounted for by adding an additional random intercept for clinician (thus now having a random intercept for clinician at Level 1 and for practice at Level 2) or incorporating elements of a marginal model and indicating that the correlation structure be incorporated into the residuals; the best-fit model was reported. Where data visualization revealed different variance in outcome at each time, a random slope for clinician was added to account for non-constant variance and a model was specified for covariance between intercepts and slopes.

Extensive analysis was undertaken to identify any violations of regression assumptions. Normality of outcome variable residuals was assessed using data visualization, Shapiro-Wilk tests, skewness-kurtosis tests for normality, and ladder of power tests. Robust standard errors were used to correct for any non-normality of the outcome variable residuals that could not be addressed through outcome variable transformation. Influential points were identified through

dfits tests, as well as visualization of outliers and points of leverage. Sensitivity analysis was performed to assess the vulnerability of the models to extreme points. Linearity of relationships between time and outcome variables was assessed with scatterplots and adjusted variable plots.

To be enrolled in an SDQ cohort, children/youth must have had a total difficulties score of 17, which corresponds to "substantial risk of clinically significant problems" (www.sdq.com). They must also have had a non-zero function score, which indicates some degree of related difficulty and distress. Even so, it is possible there may have been meaningful differences across practices in the characteristics of cohort enrollees. This was expected to moderate or even confound the degree to which changes in organizational context or service quality were associated with improvements in client outcomes from Cohort 1 to Cohort 2. For this reason, we controlled for how far above the symptoms cut-off children/youth score at baseline (rough proxy for responsiveness to treatment) and degree of functional impairment at baseline (rough proxy for acuity of current impact). There is no data on retention, but we can assume that for children/youth to reliably experience positive outcomes, they must engage in a plan of care. Outcomes thus reflect both the quality of services offered and a family's level of engagement in care over time.

Results

Twenty-nine practices participated in BMW Wave III, three of whom dropped out during the intervention. Eleven of the 29 practices were school-based health centers (SBHCs). All but three practices reported accepting uninsured patients, and the average percent of publicly-insured patients reported was 57% (range: 25 to 98%). The SBHCs were within a single urban area and the remaining practices were in urban (n=6), suburban (n=8) and rural (n=4) areas. Twenty-two practices reported being affiliated with a health system, and based on reports by BMW practice leads, three were part of an accountable care organization (ACO) and three were certified by NCQA as a patient-centered medical home (PCMH) prior to the intervention. The majority (n=22) reported past experience with quality improvement projects generally, and four reported

that this project experience was related to mental health specifically. All but three practices reported using electronic medical records (EMR) to track patient progress and/or outcomes. Each of the 18 non-SBHCs served on average 314 patients per week (range: 75 to 775) and had on average 15 total staff (range: 6 to 45), six of whom were pediatricians or nurse practitioners (range: 2 to 30). Half (n=9) reported having one or more specialists (psychiatrist, psychologist, counselor, social worker) co-located. Volume and staffing statistics were not reported for the SBHCs, who did not submit registration forms individually.

Twenty practices, including the three SBHC groups, participated in the Office Inventory. Only one practice, which dropped out, did not participate at all. Three practices, including the two additional practices who dropped out, did not complete "post" surveys. Among the 17 practices who participated in the Office Inventory at both "baseline" and "post," a total of 388 surveys were completed: 223 at baseline and 165 post-intervention. Distribution of roles was similar across time points, with approximately three-quarters of respondents self-reporting being in clinical roles baseline (73% or n=164) and post (76% or n=126) (see **Table 4.2**). Among those self-reporting as "other clinical staff," the most common roles listed were licensed practical nurse and medical assistant. Among those self-reporting as "non-clinical staff," the most common roles listed were receptionist, biller/coder, patient service representative, front desk, and office manager or coordinator. Fifty (13%) respondents were affiliated with a SBHC, and 338 (87%) were affiliated with another community- or hospital-based pediatric or family medicine practice.

Table 4.2: Roles self-reported in Office Inventory at baseline and post-intervention

Role	Baseline	Post
Social Worker	2 (0.90%)	1 (0.61%)
Physician	38 (17.04%)	29 (17.58%)
Nursing Assistant	2 (0.90%)	6 (3.64%)
Nurse Practitioner	25 (11.21%)	21 (12.73%)
Registered Nurse	42 (18.83%)	25 (15.15%)
Other Clinical Staff	53 (23.77%)	44 (26.67%)
Non-Clinical Staff	61 (27.35%)	39 (23.64%)
Total	223 (100%)	165 (100%)

Summary of Baseline Practice Characteristics

Inner organizational context domain scores for practices are displayed in **Appendix G**. Across the practices that participated in the Office Inventory at baseline (n=20), including the three that later dropped out, the Learning Collaborative means were 69% for *culture* (95% CI: 64 to 74%); 63% (59% CI: 58 to 68%) for *structure / processes*; 66% for *climate* (95% CI: 63 to 70%); and 61% for *technology* (95% CI: 52 to 70%). **Average IRA** was moderate to very strong at baseline in all but two practices (**Appendix G**). IRA estimates by domain indicated some form of lack of consensus in five practices (IDs 2, 3, 17, 19, and 21), where one or more domain scores were negative or exceeding one. This was in most cases a result of what LeBreton & Senter (2008) describe as multiple true scores. Practice scores varied around inner context domain means by an average of 7 points at baseline, with an average of 9% of the total variation in scores attributable to differences between practices (**Appendix H**). Evidence of between-practice differences (ICC) that are average to high for primary care (Adams et al., 2004) combined with moderate to very strong within-practice agreement (IRA) (LeBreton & Senter, 2008), supported aggregation of staff responses to the practice level.

The CVF positions practices on a continuum of four culture types, according to how respondents distribute points. Across the 20 practices participating in the Office Inventory at baseline, an average of 41% of points were assigned to group, 18% to developmental, 21% to hierarchical, and 20% to rational types. Distribution across the four types was not uniform, as evidenced by an average Blau index of .64 (min: .48 max: .74 median: .65). Practices had predominantly group and developmental characteristics, with an average of 59% of points assigned to these culture types (min: 41% max: 83% median: 57%).

Clinician attitudes at baseline were notably similar to those of the 420 pediatric primary care clinicians in 43 states whose responses were used to validate the short version of the PBS (McLennan et al., 1999). BMW-participating clinicians (n=96) rated on average a total score of 31.0 (95% CI: 29.0, 32.9), belief/feelings score of 15.6 (95% CI: 14.4, 16.9), and burden score of

15.4 (95% CI: 14.0, 16.7) at baseline. Belief/feelings and burden displayed modest clustering by practice, with on average 2 percent and 9 percent of total variation in attitudes, respectively, attributable to differences between practices in practice-specific mean scores.

Clinician confidence assessments were completed by 65 physicians and nurse practitioners at the first site visit. Of these clinicians, 14 completed a follow-up assessment at the fourth site visit only, five completed a follow-up assessment at 12 months only, and 33 completed follow-up assessments at both time points. Analyses were conducted on data from 52 clinicians in 17 practices that completed follow-ups, with 12-month data being used for all but the 14 clinicians who completed follow-ups at the fourth site visit only. While the 12-month data represents post-intervention, in many cases the fourth site visit was close to the 12-month point, justifying the combination of follow-ups. Based on the linear mixed-effects model of total confidence scores with no covariates and a random intercept for practice, average total confidence score at the first site visit across practices was 2.92 out of 4.00 points (95% CI: 2.75 to 3.10). There was considerable variation in confidence at baseline: Individual clinician scores varied around this mean by about half a point, and 31 percent of total variation in confidence scores was attributable to differences between practices in practice-specific mean confidence score.

Implementation Outcomes

Descriptive statistics, including the percent of variance in score that was due to differences between BMW-participating practices, are summarized in **Appendix H**. Estimated intervention effects of BMW on implementation outcomes are summarized in **Table 4.5**.

Uptake was variable across the practices that completed the Learning Collaborative. For the Breakthrough Series, all practices participated in a learning session and completed a storyboard and aim statement. This was followed by three PDSA cycles (with 93% participating in the first, 48% participating in the second, and 44% participating in the third) and 16 action period calls (with each participating in an average of 11 calls). A total of 71 site visits were

attended over the course of Wave III, and as part of these academic detailing sessions, the BMW implementation team staged 181 role plays to assess practitioner competence. Forty-four BMW participants completed one or more of the 11 online learning modules (with 43 completing the psychopharmacology module specifically). A total of 122 modules were completed, meaning the 44 who participated in online learning completed an average of three of the 11 modules. Overall, practices earned on average three stars in the five-star recognition system, and all earned at least one (**Table 4.3**). More than half of practices achieved each star, with the exception of the tracking systems and practice-based intervention stars. The latter was driven by low completion rates of online modules, as all practices completed "common factors" training and developed crisis plans.

Table 4.3: Uptake as measured by BMW Wave III Five-Star Recognition System

Star Name	**Indicators**	**Number (%) of Practices Achieving***
Resources	• Updated local mental health resource directory • Mental health promotional materials displayed in office • Mental health education materials available for clients/families	14 (54%)
Tracking	• Mental health appointment reminder system • Mental health recall system for missed appointments • Log to keep track of patients with a mental health concern	12 (46%)
Mental Health Promotion and Screening	System in place for: • providing anticipatory guidance for healthy social-emotional development in early childhood • postpartum depression screening • screening development in early childhood • autism screening; and • social emotional screening for school age through adolescence	17 (65%)
Integration Planning and Implementation	• Called local mental health providers to develop relationships • Community reception is hosted • Advanced one or more levels on the SAMHSA Standard Framework for Levels of Integrated Healthcare	17 (65%)
Practice-Based Interventions	• Staff and clinicians completed training in "common factors" and "common elements" for low mood • Clinicians completed psychopharmacology online learning module • Crisis plan in place for handling of psychiatric emergencies, including suicidality	8 (31%)

*Note: Total n=26, as each SBHC was assessed individually for the star uptake indicator.

Staff perceptions of **inner organizational context** changed significantly from baseline to post-intervention. Results of linear random intercept models used to estimate these changes show average increases in *structure / processes* of 16 points (95% CI: 12 to 20); in *culture* of 11 points (95% CI: 7 to 15); in *climate* of 6 points (95% CI: 3 to 9); and in *technologies* of 21 points (95% CI: 13 to 29). Changes in all item scores within these domains were statistically significant, with the only exception being the climate domain. Changes measured for three climate items were significant: "I have the opportunity to make full use of my knowledge and skills in caring for patients with mental health concerns" (p=0.000); "I'm unsure of my role in caring for patients with behavioral, developmental, or emotional concerns" (p=0.022); and "I am able to provide continuity of mental health care to my patients" (p=0.000). Two additional climate items neared significance: "My job makes a meaningful contribution and is important to our practice" (p=0.067) and "It's difficult for me to spend extra time with patients to address mental health concerns, since there is rarely adequate time in primary care practice" (p=0.066).

Average IRA was moderate to very strong in all practices post-intervention, with only ID 3 maintaining a lack of consensus. Results of a simple linear regression model with GEE and robust variance estimation to account for correlations within repeated measures of the outcome IRA (Liang & Zeger, 1986) show that average staff consensus on context domains also changed, increasing an estimated .12 points (95% CI: 0.024, 0.21) for a given practice from baseline to post-intervention. This finding was replicated using a paired *t*-test, which also showed IRA increasing an estimated .12 points (95% CI: 0.016, 0.22; p=0.0260).

While the majority of practices (n=14 of 17) experienced decreases in average PBS scores over time, indicating improved **clinician attitudes**, four practices (IDs 8, 9, 13, 21) experienced increases. Log of PBS scores was regressed on time using linear mixed-effects regression with random intercepts and slopes to adjust for non-normality of the outcome variable residuals, clustering, and differing practice trajectories. Clinicians' total PBS scores decreased on average 11% (95% CI: -20% to -1%) from baseline (n=96) to post (n=74) in practices that

participated in the Office Inventory at both time points (n=17). Burden domain scores decreased on average 13% (95% CI: -26% to -1.1%) and belief/feeling domain scores decreased on average 8.0% (95% CI: -19% to +2.8%). While this points to significant improvement in clinician perceptions of the impact of mental health care on workload and time, changes in feelings of competence to address mental health and changes in beliefs about patients' desire to discuss mental health were small enough to have occurred by chance. No belief/feeling item changes were statistically significant, and changes in four specific items in the burden domain were significant: "One reason I do not consider information about psychosocial problems is the limited time I have available" (p=0.012); "Evaluating/treating psychosocial problems will cause me to be more overburdened" (p=0.023); "So many issues have to be investigated when seeing patients that I do not always consider psychosocial factors" (p=0.004); and "Patients will become more dependent on me if I raise psychological concerns" (p=0.012).

Based on the linear mixed-effects model of **clinician confidence scores** with no covariates and a random intercept for practice, average total confidence increased to 3.55 points (95% CI: 3.45 to 3.65) at the final site visit (see **Figures 4.3 and 4.4**). EDA revealed that while confidence scores at baseline were fairly normally distributed, scores post-intervention were skewed left (greater density of higher confidence scores). Boxplots of clinician confidence scores at baseline showed larger differences across as opposed to within practices (suggesting random intercepts). Trajectories of clinician scores over time revealed smaller variation in confidence score post-intervention and a small degree of variation in treatment effect (suggesting random slopes); between-practice variation diminished to nearly zero post-intervention. To assess the intervention effect, log of the total confidence score was regressed on time first using a linear model with random intercepts for practice and clinician, then by adding a random slope for clinician. Elements of random effects and marginal models were then combined by including a random intercept for practice and accounting for correlation between clinician scores over time by specifying the structure be incorporated into the residuals.

Figure 4.3: Trajectory of clinician confidence scores from baseline (0) to post-intervention (1)

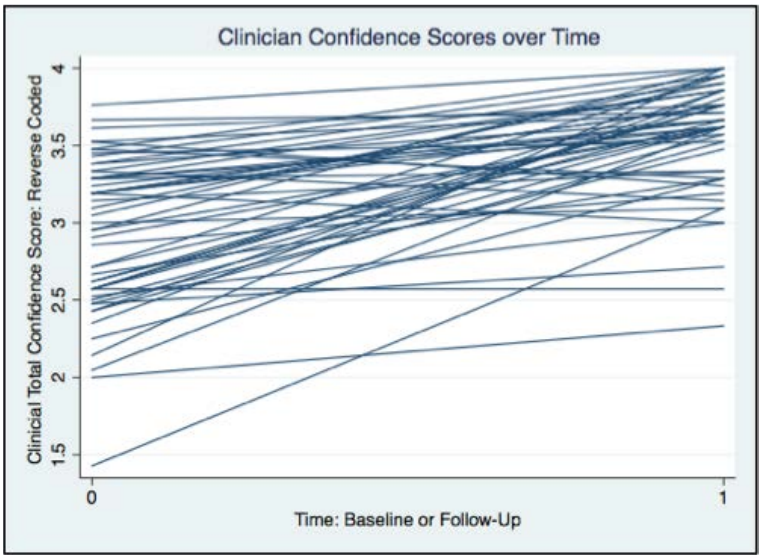
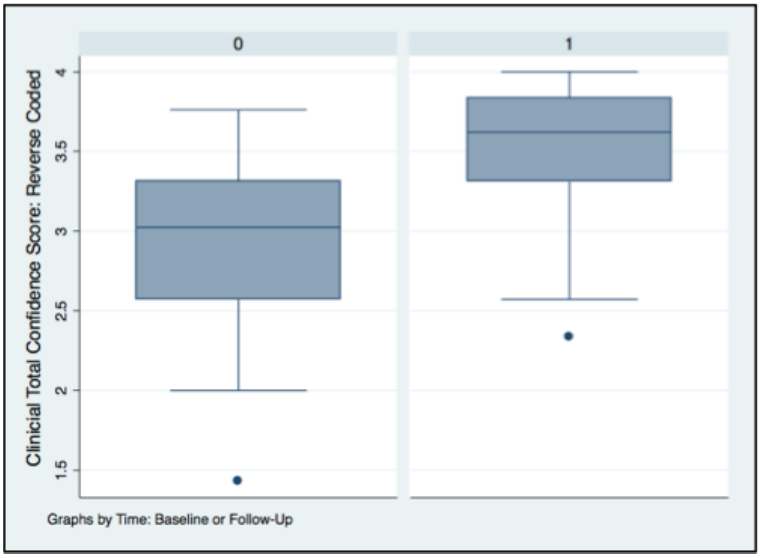


Figure 4.4: Boxplots of clinician confidence scores at baseline (0) and post-intervention (1)



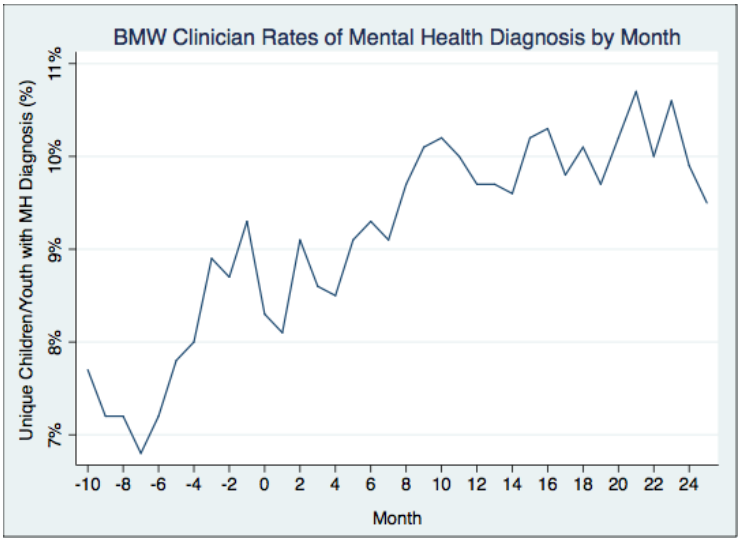
Results were consistent across models, and the first and third achieved slightly better fit. That said, EDA provided evidence of variation in clinician trajectories in competence score around practice means from baseline to post. Results are thus reported for the second model with random intercepts for practices and clinicians and random slopes for clinicians, addressing the perceived violation of the assumption that variation in baseline and follow-up measures is constant and allowing variability around the Learning Collaborative mean to change over time.

Based on the model of total competence score as a function of time, total confidence scores increased on average 20% (95% CI: 15 to 25%) from 2.92 points at baseline to about 3.55 points post-intervention. The relationship between BMW uptake and clinician confidence was expected to be positive if the intervention did enhance confidence. A Pearson correlation coefficient was computed to assess this relationship. There was a strong positive correlation between number of stars achieved and change in practice-mean clinician confidence from baseline to post-intervention ($r=0.66$, $p=0.004$, $n=17$).

Service Outcomes

Based on Medicaid/OCHIP claims, the 131 BMW-participating clinicians together cared for on average 10,028 unique children/youth per month in the six months prior to participating in BMW, 9,015 unique children/youth per month during the Learning Collaborative, and 9,406 unique children/youth per month in the six months post. The proportion of children/youth for whom one or more visits in a month was for a mental health condition increased over time from an average of 8.3 percent "pre" (Months -6 through -1) to 10.2 percent "post" (Months 18 through 23) (**Figure 4.5**). This represents a significant difference in proportions of 1.92 percentage points (95% CI: 1.59 to 2.26, $p=0.000$). Note that there was some contamination of the "pre" period for Groups 2 and 3 with the intervention. Month -6 corresponds to April 2013 for Group 1 and Month 18 corresponds to March 2015 for Group 3.

Figure 4.5: Percent of unique children/youth with a mental health diagnosis



Based on paid Medicaid/OCHIP claims, the 131 BMW-participating clinicians saw a similar number of unique children/youth "pre" (n=34,838) and "post" (n=33,819). **Table 4.6** summarizes the number and proportion of these children/youth who were diagnosed with a mental health condition at each time [based upon the mental health diagnosis code(s) appended to their encounter(s)]. A two-sample z-test for differences in proportions was conducted to test the hypothesis of no difference in proportion of children/youth who had an encounter with a mental health diagnosis specified. Significant increases were seen in the proportion of children/youth with diagnoses of disruptive behavior, ADHD, and depression/anxiety.

Table 4.7 summarizes the number and proportion of youth prescribed a psychotropic medication by *any* provider (mental health specialists included) during the "pre" or "post" period during which the youth had an encounter with a BMW-participant clinician. Of the youth who had an encounter at pre (n=34,838), 3,593 (10.3%) were prescribed a psychotropic medication. Of those who had an encounter at post (n=33,819), 3,495 (10.3%) were prescribed a psychotropic medication. Thus, overall rates of psychotropic prescribing remained stable. However, there were significant decreases in the proportion of youth prescribed drugs in the atypical antipsychotic (27.4% decrease, p=0.0001), typical antipsychotic (41.5% decrease, p=0.000), tricyclic

antidepressant (27.2% decrease, p=0.0487), non-stimulant atomoxetine (33.1% decrease, p=0.0009), and mood stabilizer (54.2% decrease, p=0.0209) classes. There were no instances of combination atypical antipsychotic/SSRI, anticonvulsants, or monoamine oxidase inhibitors prescribed at "pre" or "post" and there was one instance of a medication in the benzodiazepine class being prescribed at "pre," but no instances at "post."

Next, we looked to see whether these same changes in prescribing were evident among BMW-participating clinicians. **Table 4.8** summarizes the number and proportion of youth prescribed one or more psychotropic medications by a *BMW-participating clinician* during the during the "pre" or "post" period during which the youth had an encounter. BMW-participating clinicians also decreased their rates of typical antipsychotic (-37.4%, p=0.0379) prescribing. Their decreases in non-stimulant atomoxetime, atypical antipsychotic, and tricyclic antidepressant prescribing did not reach statistical significance. Among these clinicians, there was a modest 8.78% increase in overall psychotropic medication prescribing (p=0.0046), driven by a 9.49% increase in stimulant prescribing (p=0.0078). All mood stabilizers (with exception of one prescription in the "pre" period) were prescribed by non-BMW-participating clinicians.

At last, we narrowed our focus to those prescriptions (1) made by BMW clinicians and (2) filled for children/youth who had one or more encounter with a BMW clinician for any mental health condition commonly seen in primary care, as indicated by the ICD-9 diagnosis code associated with the encounter (see **Appendix F**). First, we looked to see whether, even though there was no increase or decrease in atypical antipsychotic (AAP) prescribing among BMW clinicians, there was any change in the proportion of prescriptions made for youth diagnosed with a potentially appropriate condition (bipolar disorder, disruptive behavior, autism spectrum disorder, or intellectual disability/developmental delay). Of the 80 clients filling an AAP prescription in the "pre" period, 19 (23.8%) had a potentially appropriate condition identified by their primary care clinician, and of the 77 clients filling an AAP prescription in the "post" period, 35 (45.0%) had a potentially appropriate identified by their primary care clinician. This points to

a shift to more appropriate atypical antipsychotic prescribing among BMW-participating clinicians. Similarly, we looked to see what proportion of stimulant, atomoxetine and alpha agonist prescriptions were for potentially appropriate ADHD conditions. Of the 1,817 clients filling prescriptions in these classes in the "pre" period, 1,581 (87.0%) had a potentially appropriate condition identified by their primary care clinician, and of the 1,734 clients filling prescriptions in these classes in the "post" period, 1,591 (91.8%) had a potentially appropriate condition identified by their primary care clinician. This again points to a shift to more appropriate prescribing patterns for these medications among BMW-participating clinicians.

At last, we looked for changes in rates of two potentially contraindicated prescribing practices addressed in BMW. Clinicians were taught that for youth with bipolar conditions, ADHD medications should be used with extreme caution and SSRI medications are contraindicated. In the "pre" period, 18 of 54 youth (33.3%) diagnosed with bipolar disorder were prescribed an SSRI, stimulant, and atomoxetine, and in the "post" period, 30 of 74 youth (40.5%) diagnosed with a bipolar disorder were prescribed an SSRI, stimulant, or atomoxetine. This difference in proportions of 7.20 percentage points was not significant (p=0.4055). Clinicians were also taught that for youth with disruptive behavior conditions, use of alpha agonists and atypical antipsychotics is off-label and poorly studied, and behavioral interventions are first-line treatment. In the "pre" period, 84 of 406 youth (20.7%) diagnosed with a disruptive behavior condition were prescribed an alpha agonist or atypical antipsychotic, and in the "post" period, 103 of 491 youth (20.9%) were prescribed an alpha agonist or atypical antipsychotic. Likewise, this difference in proportions of 0.29 percentage points was not statistically significant (p=0.9158).

Client Outcomes

A total of 421 youth were enrolled in one of two SDQ cohorts, cohort one (n=207) at the start of the Learning Collaborative ("baseline") and cohort two (n=214) after completion of the learning session and four academic detailing sessions ("post"). For the 207 children/youth

enrolled in cohort one, 27 parents completed 3-month follow-ups only, 30 completed 6-month follow-ups only, and 20 completed both. For the 214 children/youth enrolled in cohort two, 7 parents completed 3-month follow-ups only, 36 completed 6-month follow-ups only, and 40 completed both. Sixty-three percent (n=130) of families in cohort one and 61% (n=131) of families in cohort two did not complete a follow-up SDQ. Thus, a total of 160 children/youth had at least one follow-up SDQ completed.

Of the 26 practices who did not drop out and who therefore enrolled children/youth in cohorts, eleven (specifically the 11 SBHCs) did not submit follow-up SDQs. Thus, a total of 15 practices or "clusters" of children/youth were included in our analysis of SDQ data. Practice 3 did not administer any three *or* six-month follow-ups for Cohort 2; Practice 14 did not administer any three-month follow-ups for Cohort 2; Practice 11 did not administer any three-month follow-ups for Cohort 1; and Practice 6 did not administer any six-month impact score follow-ups for Cohort 1. This further reduced the number of practices included by 1 to 3, depending upon the analysis.

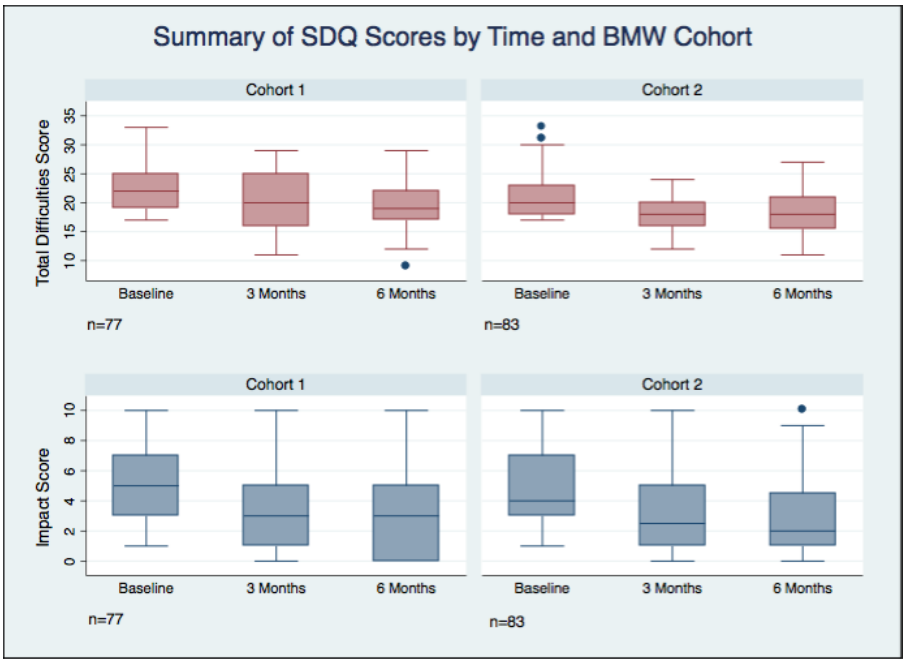
Table 4.4 provides a comparison of Cohorts 1 and 2 SDQ scores at baseline. These differences, calculated using a two-tailed t-test (α=0.05) for independent samples, underscore the importance of controlling for hypothesized confounders, including how far above the symptoms cut-off clients score at baseline (rough proxy for responsiveness to treatment), and the impact score or degree of functional impairment at baseline (rough proxy for acuity of current impact).

Table 4.4: Baseline characteristics of children/youth by BMW cohort

	Cohort 1	Cohort 2	Difference
Symptoms Score	22.2 (SD = 3.79)	21.1 (SD = 3.67)	1.16 (p=0.05)
Impact Score	4.92 (SD = 2.60)	4.70 (SD = 2.65)	0.22 (p=0.59)

Visualization of BMW data shows SDQ difficulties (symptoms) and impact scores generally decreasing from baseline to three months and maintaining improvement from three to six months (**Figure 4.6**).

Figure 4.6: SDQ difficulties (symptoms) and impact (function) scores over time by cohort



Improvement in SDQ score experienced by children/youth in Cohort 2 as compared to Cohort 1 was calculated to estimate the intervention effect, and differences between the two cohorts at baseline in terms of degree of functional impairment and the amount by which scores exceeded the symptoms cut-off were controlled for. A negative difference points to an intervention effect, since Cohort 2 represents post-intervention and Cohort 1 represents baseline, and a decrease in score on the SDQ signifies improvement. For example, if youth in Cohort 1 saw a difference of -5 from baseline to six months, and youth in Cohort 2 saw a difference of -8, the estimated intervention effect would be -3. This would mean that children/youth with mental health conditions experienced greater improvement in symptoms and function when cared for by providers who had completed the BMW intervention.

A linear mixed-effects models of change in symptoms scores with no covariates and a random intercept for practice showed the value of the random intercept approaching zero, although visualization of the data showed that a small amount of clustering may be present. Models therefore reduced to multivariable linear regression with robust variance estimators to

ensure any small degree of clustering was accounted for. Four influential observations with high leverage and residuals were identified, and results of regression models with and without these influential observations are presented in **Table 4.9**. Symptoms scores improved an additional 0.981 points (95% CI: -1.90, -0.060) from 0 to 3 months, and an additional 1.30 points (95% CI: -2.75, 0.160) from 0 to 6 months, for Cohort 2 as compared to Cohort 1, controlling for difficulties and impact scores at baseline. This provides evidence of an increase in child/youth symptom improvement from Cohort 1 to Cohort 2.

Discussion

Overall, this quasi-experimental study provides initial evidence that a complex intervention addressing individual and organization factors in tandem may be effective in achieving mental health service implementation in pediatric primary care. Practices achieved measureable improvement in child/youth mental health outcomes, as measured by the SDQ.

They also demonstrated greater rates of screening, diagnosis, and treatment over time, as evidenced by a larger proportion of encounters billed with mental health diagnosis codes. A two-percentage-point increase sustained in the six months following the intervention (the furthest we could look out at this time) is substantial when one considers this corresponds to an additional ~ 2,000 children/youth benefiting from early intervention and treatment in the primary care setting in a year, *just* in the 29 BMW-participating practices and *just* counting children/youth with diagnoses billed to Medicaid/OCHIP by their primary care clinicians. That rates of diagnosis should increase from 8.3% to 10.2% is substantial given epidemiological data suggesting that in the United States, between 13 and 20 percent of children and adolescents are estimated to have diagnosable mental disorders (Centers for Disease Control and Prevention, 2013). An additional 20 percent are though to have functional problems relating to behaviors or feelings that do not meet the threshold for diagnosis (Angold et al., 1999). Thus, the proportion of youth with mental health diagnoses came close to the lower bound of national prevalence estimates following

completion of the intervention. Results were especially promising for the detection of disruptive behavior, ADHD, and anxiety/depression disorders. The potential for primary care clinicians to prevent or shape trajectories of these disorders through regular mental health screening – beginning in the first few months of life – is brought into relief by our growing understanding of brain development. Babies are born with very high neuronal density; significant pruning and programmed death of neurons and refinement of connections occurs between years one and seven; and development continues into the early twenties. These conditions tend to onset with milestones of development, with potentially modifiable biological, social, and environmental factors together influencing a youth's chances of experiencing a disorder. For example, physical and social activities promote cognitive and brain health (Carlson, 2011), whereas chronic stress impairs prefrontal cortex functioning (Liston, McEwen, & Casey, 2009). Primary care staff are in a unique position to develop trusting relationships with children/youth and, when they have regular contact over multiple decades, identify changes that might be red flags for concern. As Carlson, Eldreth, Chuang, & Eaton (2012) summarize, for adolescents, "the goal is to remediate developmental delays and deficits (as well as environmental barriers) during the critical arc of brain-behavior development" (p. 556), and for children, "programs focused on cognitive health also can capitalize on what is known about brain development in enriched environments, such as aiding and encouraging children to read, an important vehicle to learning during the critical early years" (p. 557). Having engaged them in screening that coincides with biological milestones, and coordinated care with families, teachers, mentors, counselors, and other community organizations to promote their healthy development, BMW clinicians have taken steps to help youth transition into healthy adulthoods.

BMW-participating clinicians demonstrated significant decreases in typical antipsychotic prescribing and more appropriate atypical antipsychotic prescribing over time. They also increased their prescribing of stimulant medications from "pre" to "post," predominantly for youth that they diagnosed as having an ADHD condition. Potentially contraindicated use of

ADHD medications in youth with bipolar conditions stayed the same over time at around one-third of youth, indicating BMW did not make an impact in this area. That said, for youth with these symptoms, close consultation with psychiatry was recommended, so it is possible that the clinicians were coordinating with mental health specialists in making this prescribing decision. Rates of alpha agonist and atypical antipsychotic prescribing for youth with disruptive behavior conditions held steady at about 20 percent in both the pre and post period. It is possible that, for these youth, the medications were used as adjunctive therapy to treat symptoms, but future Learning Collaboratives should continue stressing that these medications are not "curative."

Uptake of the BMW intervention was variable, with three practices dropping out, and in-person components achieving far greater participation than online learning modules. All practices engaged in lectures, intergroup dialogue, role plays, and evaluation through a series of four site visits. Aspects described by participants in in-depth interviews as "working well" were didactic presentations; video vignettes of patient-provider interactions; hands-on materials; and opportunities for all staff to interact and ask questions. In-person engagement was said to lend a human touch that was missing from online communities and critical to maintaining focus in light of "internet fatigue," "information overload," and the many competing priorities vying for providers' attention. Social learning through observation of positive outcomes reinforced what was taught in lectures and motivated staff to try out approaches they hadn't yet considered for themselves. That said, clinical staff said that BMW fell short in imparting the intuition that comes from experience in mental health practice. Creative forms of engagement that could enhance this intuition and the so-called conditioning of new behavioral skills into habits are needed.

At the individual level, the degree to which clinicians saw mental health care as a burden and their confidence in using "common factors" communication skills and "common elements" intervention skills improved significantly. This finding was corroborated by interviews, in which practitioners described how skills for interviewing and fact-finding, setting an agenda, introducing screening results, talking about mental health, problem-solving, and scheduling

subsequent visits helped to "prioritize," "keep on track," and "focus conversations." Non-clinical staff and medical assistants, too, described being better able to "interview families," "triage" concerns, and ultimately "have more to present to" the clinician. A few said their practices were seeing more patients due to efficiencies gained across the entire team and that integrating mental health care "saves you time and energy" in the long-run by "getting to the bottom" of psychosocial concerns. Nearly all participants described greater self-efficacy in talking to families about mental health, addressing common concerns, and coordinating with community mental health providers. Other changes since the site visits that they noted include greater "attention to" and "awareness of" mental health; "recognizing anxiety and depression more"; and greater "confidence" and "comfort" and feeling "better prepared" and less "insecure" in addressing these topics with children/youth and caregivers. Positive changes in the PBS burden subscale, which measures impact on workload, demands, and time, make sense in light of interviews, but insignificant changes in the beliefs and feeling subscale are counterintuitive. Other studies in pediatric primary care have found similarly counterintuitive results (Wissow et al., 2011), and McLennan et al. (1999, p.28) have suggested that the short version provides "only a modest amount of information about primary care practice regarding psychosocial problems in children." Research is needed to revalidate the PBS to understand if it measures a positive psychosocial orientation as it is defined today and remains predictive of outcomes in pediatric primary care.

At the organization level, findings relating to burden and confidence coincided with similarly robust changes in climate, the surface-level experiences of what it's like working in a particular office. Of the five item changes that approached or achieved significance, four related to the climate dimension of role conflict and ambiguity and one related to job importance (James & Sells, 1981). That other items saw no change may indicate that the intervention had the greatest impact on perceptions of climate stemming from individual (vs. team, leader, or organization) attributes. Changes indicated staff felt more sure of their roles; had greater opportunity to make use of their knowledge and skills; were better able to provide continuity of care to their patients;

found it less difficult to take the time to address mental health; and were more apt to perceive their job as making a meaningful contribution and being important to their practices. These findings were partially corroborated by qualitative interviews: Staff described how being an agent for change "made me like my job more" and "makes you feel good about where you work." However, based on interviews, perceptions of the climate for mental health services was still mixed at the conclusion of BMW. Clinicians described an ongoing feeling of role conflict, in light of high caseloads and competing medical priorities. This was particularly salient among those in rural and underserved communities and for whom fee-for-service incentive systems made shifting time to mental health care to maximize health outcomes financially infeasible. That the climate domain saw the least change may indicate that the atmosphere produced by cultures and structures takes longer to change or misalignment between cultures (e.g. mental health as a primary goal) and practices (e.g. incentive systems that align with this goal).

At the organization level, findings also pointed to an enhancement of culture to be more supportive of mental health, in terms of deep-seated values such as being supportive of people facing mental health challenges and valuing evidence-based practice, and artifacts such as sharing responsibility for mental health care across all roles and levels and having a champion. These findings were corroborated by the four major culture-related themes that arose from interviews. These include having project champions and support from leadership; all-staff participation and teamwork; lived experience and sense of mission; and treating mental health as part of whole health. Changes in the systems/structures and technologies domain and achievement of BMW Star Recognition provided evidence of enhancements made to more system-related elements of the CCM, including community linkages (e.g. developing collaborative relationships with school- and community-based providers), delivery system design (e.g. staff roles assigned to monitor patients' progress), child and family support (e.g. incorporating conversations about mental health into each office visit), clinical information systems (e.g. mental health appointment reminder system in place), and decision support (e.g. use of validated screening and assessment tools).

At last, a notable but unexpected finding was a large and significant change in consensus over time, which may point to greater "strength" of culture and climate (Martin, 1992, 2002; Schneider et al., 2013), more equitable staff awareness of and access to structures/processes for mental health care, and buy-in to BMW in general. This finding is significant given evidence that how individual staff perceive context relative to their co-workers carries meaning beyond the values of practice-average scores (Schoenwald, Carter, et al., 2008).

There are several important limitations to this study. Because practices self-selected to participate, it was likely that they represent early adopters (Rogers, 2003). The quasi-experimental single-group pretest-posttest design, which allowed for some contamination of "baseline" surveys with the intervention, was another primary limitation. Such a design brings with it threats to internal validity, most notably regression to the mean and insufficient control of confounders such as the potential existence of larger system-level influences at the same time as the intervention (Harris et al., 2006). That said, the fact that we compared each practice to itself and took into account practice-level acuity in the SDQ analyses controlled for some of this bias. Diverse data sources and the ability to juxtapose quantitative and qualitative interview findings also served to strengthen the validity of results. All interviewees were asked to describe other child mental health initiatives in their communities, and none reported any concurrent programs. For the SDQ cohorts, we had additional challenges of a low sample size of practices and children/youth per practice; one or two physicians dominating SDQ administration in any given practice; and practices having slightly different intervals of time between the two cohorts given practical issues of implementing new evidence-based practice. At last, our research was not designed in a way that enabled us to measure the contribution of each component to outcomes. That said, available survey and interview data support the designation of academic detailing in "common factors" and "common elements" as a core component and suggest that online learning played a relatively insignificant role. Research is needed to pinpoint the core components and forms of engagement that are necessary or sufficient to achieving outcomes like those seen in

BMW; to study their cost-effectiveness; and to explore the means and efficacy of disseminating complex mental health service implementation more broadly in pediatric primary care.

The handful of studies that have tested the effects of organizational context interventions in primary care and child welfare settings have shown mixed results. While the ARC intervention was associated with positive changes in organizational social context, child/youth psychosocial function, and caseworker turnover in child welfare settings (Glisson et al., 2006, 2013), a general practice intervention using the Frankfurt Patient Safety Matrix did not bring about any of the hypothesized changes in patient safety structures/processes, climate, or behaviors (Hoffmann et al., 2011). The finding that this complex intervention was effective in achieving outcomes at three levels, inclusive of four domains of organizational context, is therefore promising and the mechanisms deserve further consideration. Robust uptake of BMW Wave III, combined with evidence of significant intervention effects and variation in context across practices, enable us to explore some of these potential mechanisms. In a subsequent study, we test the hypothesized role of organizational context as a moderator of BMW implementation.

Table 4.5: Summary of simple linear regressions of BMW Wave III outcomes on time (intervention effects)

Outcome Variable	Coefficient	SE	(95% CI)	p-value
Linear mixed-effects model of outcome (Y_{ij}) as a function of time, w/ random intercepts for practice ($\boldsymbol{\beta}_{oj}$): $Y_{ij} = \boldsymbol{\beta}_{oj} + \boldsymbol{\beta}_1 Time_{ij} + \boldsymbol{\varepsilon}_{ij}$, where i=staff, j=practice $\boldsymbol{\beta}_{oj} = \boldsymbol{\beta}_o + b_{0j}$ $b_{oj} \sim N(0, \boldsymbol{\tau}^2)$, $\boldsymbol{\varepsilon}_{ij} \sim N(0, \boldsymbol{\sigma}^2)$ corr(b_{oj}, $\boldsymbol{\varepsilon}_{ij}$) = 0				
Culture (%)	11.2	1.92	(7.39, 14.9)	0.000
Structure / processes (%)	15.8	1.96	(11.9, 19.6)	0.000
Climate (%)	6.29	1.64	(3.08, 9.50)	0.000
Technologies (%)	20.3	4.00	(12.5, 28.2)	0.000
Simple linear regression model of outcome (Y_{ij}) as a function of time with GEE and robust variance estimation: $Y_{it} = \boldsymbol{\beta}_0 + \boldsymbol{\beta}_1 Time_{it1} + \varepsilon_{it}$, where i=practice, t=time corr(Y_{it}, Y_{it*}) = r_{jj*} (within-practice correlation across 2 times: t, t*) $\boldsymbol{\rho}(Y_{it}, Y_{it*}) = \boldsymbol{\rho}$, $t \neq t'$(assuming an exchangeable working model)				
IRA	0.118	0.048	(0.024, 0.212)	0.014
Linear mixed-effects model of log outcome (Y_{ij}) as a function of time, w/ random intercepts ($\boldsymbol{\beta}_{oj}$) and slopes ($\boldsymbol{\beta}_{1j}$): $\log(Y_{ij}) = \boldsymbol{\beta}_{oj} + \boldsymbol{\beta}_{1j} Time_{ij} + \boldsymbol{\varepsilon}_{ij}$, where i=staff, j=practice $\boldsymbol{\beta}_{oj} = \boldsymbol{\beta}_o + b_{0j}$ $\boldsymbol{\beta}_{1j} = \boldsymbol{\beta}_1 + b_{1j}$ $b_{oj} \sim N(0, \boldsymbol{\tau}_1^2)$ $b_{1j} \sim N(0, \boldsymbol{\tau}_2^2)$ $\boldsymbol{\varepsilon}_{ij} \sim N(0, \boldsymbol{\sigma}^2)$ cov($\boldsymbol{\beta}_{oj}$, $\boldsymbol{\beta}_{1j}$) = $\boldsymbol{\tau}_{12}$ = unstructured				
Belief/feelings	-0.0804	0.0553	(-0.189, +0.0280)	0.146
Burden	-0.133	0.0622	(-0.255, -0.0109)	0.033
PBS total	-0.106	0.0496	(-0.203, -0.00902)	0.032

Linear mixed-effects model of log outcome (Y_{ijk}) as a function of time, with random intercepts for practice (β_{oj}) and clinician (β_{ojk}) and random slopes (β_{1j}) for practice: $\log(Y_{ijk}) = \beta_{oj} + \beta_{ojk} + \beta_{1j}Time_{ij} + \varepsilon_{ij}$, where i=staff, j=clinician, k=practice $\beta_{oj} = \beta_o + b_{0j}$ $\beta_{ojk} = \beta_o + b_{0jk}$ $\beta_{1j} = \beta_1 + b_{1j}$ $b_{oj} \sim N(0, \tau_1^2)$ $b_{ojk} \sim N(0, \tau_2^2)$ $b_{1j} \sim N(0, \tau_3^2)$ $\varepsilon_{ijk} \sim N(0, \sigma^2)$ $cov(\beta_{oj}, \beta_{ojk}, \beta_{1j}) = \tau_{123}$ = unstructured				
Confidence	0.203	0.252	(0.153, 0.252)	0.000

Table 4.6: Rates of mental health diagnoses for unique children/youth with encounters in six months pre and post BMW

	Freq. Pre	Prop. Pre	Freq. Post	Prop Post	Difference in Proportion	Pct. Increase or Decrease	P-value
Intellectual disability / developmental delay	194	0.56%	170	0.50%	-0.05	-9.73%	0.328
Autism spectrum disorder	181	0.52%	178	0.53%	0.01	1.30%	0.902
Disruptive behavior	406	1.17%	491	1.45%	0.29	24.58%	0.001
ADHD	2145	6.16%	2471	7.31%	1.15	18.67%	0.000
Bipolar disorder	54	0.16%	74	0.22%	0.06	41.17%	0.053
Anxiety or depression	435	1.25%	670	1.98%	0.73	58.66%	0.000

Table 4.7: Rates of prescribing for unique children/youth with encounters in six months pre and post BMW (all prescribers)

	Freq. Pre	Prop. Pre	Freq. Post	Prop Post	Difference in Proportion	Pct. Increase or Decrease	P-value
Atypical antipsychotic	339	0.97%	239	0.71%	-0.0027	- 27.4%	0.0001
Typical antipsychotic	166	0.48%	95	0.28%	-0.0020	- 41.0%	0.0000
SSRI	396	1.14%	403	1.19%	0.00055	+ 4.84%	0.5021
Alpha agonist	921	2.64%	934	2.76%	0.0012	+ 4.47%	0.3400
Tricyclic antidepressant	92	0.26%	65	0.19%	-0.00072	- 27.2%	0.0487
Stimulant	2267	6.51%	2305	6.82%	0.0031	+ 4.74%	0.1051
Non-stimulant atomoxetine	171	0.49%	111	0.33%	-0.0016	- 33.1%	0.0009
Mood stabilizer	27	0.08%	12	0.04%	-0.00042	- 54.2%	0.0209
Other psychotropic	230	0.66%	219	0.65%	-0.00013	- 1.91%	0.8373
Any psychotropic	3593	10.3%	3495	10.3%	0.00021	+ 0.20 %	0.9280

Table 4.8: Rates of prescribing for unique children/youth with encounters in six months pre and post BMW (BMW prescribers only)

	Freq. Pre	Prop. Pre	Freq. Post	Prop Post	Difference in Proportion	Pct. Increase or Decrease	P-value
Atypical antipsychotic	94	0.27%	88	0.26%	-0.000096	- 3.56%	0.8066
Typical antipsychotic	51	0.15%	31	0.09%	-0.00055	- 37.4%	0.0379
SSRI	156	0.45%	171	0.51%	0.00058	+ 12.9%	0.2711
Alpha agonist	510	1.46%	540	1.60%	0.0013	+ 9.07%	0.1563
Tricyclic antidepressant	35	0.10%	20	0.06%	- 0.00041	- 41.1%	0.0557
Stimulant	1591	4.57%	1691	5.00%	0.0043	+ 9.49%	0.0078
Non-stimulant atomoxetine	79	0.23%	59	0.17%	-0.00052	- 23.1%	0.1260
Mood stabilizer	1	0.00%	0	0.00%	--	--	--
Other psychotropic	45	0.13%	53	0.16%	0.0002755	+ 21.3%	0.3392
Any psychotropic	2070	5.94%	2186	6.46%	0.00522	+ 8.78%	0.0046

Table 4.9: Results of multivariable linear regression models of change in symptoms by BMW cohort

	Change in Symptoms: 0 to 3 Months		Change in Symptoms: 0 to 6 Months	
	β (95% CI)	*P* Value	β (95% CI)	*P* Value
Model 1: Influential Observations Dropped		n=94		n=126
Multivariable Model Intercept	3.06 (0.0815, 6.05)	0.044	3.09 (-0.495, 6.68)	0.086
Cohort				
Cohort 1[R]	Reference	Reference	Reference	Reference
Cohort 2	-0.981 (-1.90, -0.060)	0.038	-1.30 (-2.75, 0.160)	0.077
Baseline Impact Score	-0.392 (-0.822, 0.037)	0.071	-0.397 (-0.674, -0.120)	0.008
Baseline Symptoms Score	-0.461 (-0.750, -0.172)	0.004	-0.393 (-0.628, -0.158)	0.003
Model 2: Influential Observations Included		n=92		n=122
Multivariable Model Intercept	4.07 (0.939, 7.21)	0.011	2.86 (-0.043, 5.76)	0.053
Cohort				
Cohort 1[R]	Reference	Reference	Reference	Reference
Cohort 2	-1.27 (-2.41, -0.135)	0.031	-1.01 (-2.72, 0.699)	0.226
Baseline Impact Score	- 0.417 (-0.839, 0.005)	0.052	-0.334 (-0.574, -0.094)	0.010
Baseline Symptoms Score	-0.562 (-0.866, -0.257)	0.001	-0.547 (-0.830, -0.264)	0.000

Abbreviations: CI, confidence interval; R, reference or intercept

CHAPTER FIVE: MANUSCRIPT FOUR

The Role of Organizational Context in the Implementation of a Statewide Initiative to Integrate Mental Health Services into Pediatric Primary Care

"We shape our buildings; thereafter they shape us."

– Winston Churchill

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Abstract

Background. Pediatric primary care providers are in a unique position to lead mental health promotion efforts in their communities. Yet the full potential of their role is under-realized, due to issues such as a fragmented health system, attitudes toward mental health care, and limited skills training. Organizational context is a known determinant of successful practice transformation, but it is unclear what facets of organizational context matter most to mental health service implementation in child health care settings. ***Methods.*** Data on inner and outer organizational context, clinician attitudes, clinician confidence, and uptake of program activities were collected through surveys over the course of the Ohio Building Mental Wellness (BMW) Wave III Learning Collaborative. Linear mixed-effects models with random intercepts for practice were used to test the moderating effects of organizational context on changes in attitudes, confidence, and uptake, and correlation coefficients were used to test the association between baseline context and changes in context from baseline to post-BMW-intervention. Boolean qualitative comparative analysis was additionally used to search for combinations of outer context variables that are necessary or sufficient for uptake. At last, findings were overlaid with themes from a concurrent qualitative research study to submit recommendations for creating an organizational context more supportive of mental health. ***Results***. There was a negative relationship between baseline inner context score and changes in inner context. Practices in urban areas, accredited ACOs, and those with a co-located mental health specialist at the start of the Learning Collaborative experienced greater changes in inner context, and those in rural areas experienced smaller changes. Higher culture, structure/processes, and technology scores, and more group/developmental cultures were associated with increased uptake, and climate exerted both individual psychological and contextual effects on clinician attitudes. Elements of outer/fixed context that were found to have a significant association with implementation outcomes include PCMH status (↑ uptake, ↑ change in confidence), use of EMR to monitor patient outcomes (↑ uptake), percent group/developmental (↑ uptake), high percent publicly-insured (↓ uptake, ↓

change in attitudes), rural location (🡻 change in confidence), past QI experience (🡻 change in confidence), and co-located mental health specialist (🡹 change in confidence). Boolean analysis corroborated and added depth to these findings, revealing that in our sample, EMR use was sufficient for "leading" uptake status and that the *combination* of a practice's payer mix and existence of a co-located mental health specialist; and the *combination* of health system affiliation and within-practice resource availability. ***Conclusions.*** Practices would benefit from assessing their inner organizational context and taking steps to address it prior to or in tandem with mental health service implementation. While outer context is typically less amenable to change, it is still important to take into account potential facilitators/barriers when deciding upon aims and implementation strategies.

Background

Mental health is the most common concern that families bring to pediatric primary care providers (Blanchard et al., 2006) and the leading cause of childhood disability (Halfon et al., 2012) in the United States (U.S.) (Stein et al., 2015). Yet only 1 in 5 youth with mental health conditions are identified by their pediatricians, and only a fraction of these youth will go on to receive treatment (Simonian, 2006). Health care spending has risen more rapidly for youth than for individuals of any other age group, with areas of most rapid growth including potentially avoidable inpatient mental health encounters (Health Care Cost Institute, 2012). The cost of mental disorders among youth is estimated to be $247 billion per year (CDC, 2013).

By identifying and addressing warning signs during critical windows of development, pediatricians may help to disrupt the modes by which mental disorders are manifested (Committee on Integrating the Science of Early Childhood Development, 2000), helping youth to achieve better health (Forrest & Riley, 2004). However, providers face many barriers to mental health care coordination. It is estimated that there are only about 8,000 practicing child and adolescent psychiatrists in the U.S. (AMA, 2014), and this workforce is inequitably distributed

(Thomas & Holzer, 2006; Thomas et al., 2009). Youth in rural settings have an especially difficult time accessing care, as do minority groups such as black and Latino youth, who are half as likely as white youth to initiate care (Cook et al., 2013). At the same time, pediatricians feel unprepared to identify, diagnose, or treat mental conditions (Boreman et al., 2007; Green et al., 2014). Results of a periodic survey conducted by the American Academy of Pediatrics (AAP) found little to no change in these practices over the past decade (Stein et al., 2015). This may in part be attributed to how difficult it is to incorporate evidence-based practices in child mental health into everyday practice (Weisz et al., 2013).

In light of epidemiological and health services trends, findings that the Ohio BMW Wave III Learning Collaborative (BMW) brought about positive shifts in child/youth mental health outcomes in pediatric primary care and family medicine practices (from this point forward referred to as "pediatric primary care") are promising and deserve further consideration.
In this study, we report on the theory-testing stage of a mixed-method study of the role of "organizational context" in implementing mental health services. In prior studies we explored BMW participant perceptions of this phenomena through qualitative in-depth interviews (King, 2016c), presented a systematic review of the literature and revised inventory for assessing organizational context in pediatric primary care (King, 2016a), and demonstrated an association between the BMW intervention and outcomes at multiple levels (King, 2016b). Here, we test the theory that "organizational context," in its many facets, is a determinant of the success of integration programs such as BMW.

The learning collaborative (LC) approach to organization change was first reported on by the Institute for Healthcare Improvement (2003). A core component of BMW and many other LCs is the "breakthrough series," an approach to quality improvement that involves a community or coalition selecting a topic; recruitment of faculty and organizations; and implementation of a series of learning sessions and "plan, do, study, act" or "Deming" cycles (Moen & Norman, 2010). While there is evidence of their potential to "improve service provider skills, provide

support, and structure environments to result in lasting change" (MacDonald-Wilson & Nemec, 2015), research on the effectiveness of LCs is lacking (Nadeem et al., 2014) and our understanding of how and why LCs support practice change is also limited (Shaw et al., 2013). One of the mechanisms by which LCs may initiate organization change is by supporting practices in creating awareness of and initiating shifts in "organizational context." The concept is nominally defined for this study as attributes of the internal ("inner context") and external ("outer context") environments and inter-organizational networks in which providers operate. Nominal and operational definitions of domains measured in this study are presented in **Table 5.1**.

Kaplan *et al.*, in their review of the literature on the influence of context on quality improvement success (2010), identified a need for mixed-methods research and conceptual models to better elucidate the relationship between context and outcomes. To this end, the objectives of this study were to:

1. Test, through statistical analysis of survey data, whether baseline inner organizational context and aspects of outer/fixed organizational context (payer mix, health system affiliation, medical home and accountable care organization status, urban/suburban/rural, weekly patient volume, co-located mental health specialists, prior QI experience, use of electronic medical records) moderate implementation outcomes.

2. Use qualitative comparative analysis to illuminate combinations of outer/fixed context characteristics that are necessary or sufficient for a practice to be "leading" or "lagging" in uptake of Learning Collaborative activities.

A multi-method approach to studying the role of context in uptake, in particular, was undertaken to elicit as much information as possible from our modest sample of practices. We enter into both statistical analyses and comparative approaches with the same hypotheses to see if similar elements of organizational context would be found predictive of uptake (statistically) in a hypothetical larger population or sufficient to uptake (qualitatively) in our small sample of practices. We in turn draw upon the literature and qualitative interview findings to discuss the role of organizational context in pediatric primary care practice change and offer some practical recommendations for clinical and non-clinical staff.

Table 5.1: Nominal and operational definitions of inner and outer/fixed organizational context

Culture	Shared values and associated behavioral norms and assumptions that explain "why" people behave the way they do in an organization (Schneider, Ehrhart, & Macey, 2013; Weiner et al., 2013)	Operationalized as (1) a six-item scale that measures cultural *artifacts* (e.g. "my coworkers are supportive of people facing mental health challenges") and *values* (e.g. "people in my practice value research relating to the importance of early detection and treatment of mental health conditions") (Schein, 2010) and (2) a 20-item application of the *competing values framework* (Kimberly & Quinn, 1984; Quinn & Rohrbauch, 1981, 1983; Shortell et al., 1995)
Structure / processes	Specialization, standardized policies and procedures, and configuration of roles and authority within an organization (Pugh, 2007). To emphasize that structure encompasses planned sequences of events in health care delivery, the word *processes* is appended to *structure*. Inter-organizational networks, which give rise to shared norms and bridging social capital for organizations (Damschroder et al., 2009; Greenhalgh et al., 2004), may be considered outer context, but are categorized here as structures insofar as community linkages and decision support map to the CCM.	Operationalized as an index of 15 items indicative of the presence or absence of structures (e.g. "my practice has staff roles assigned to effectively monitor patients' progress…") and processes (e.g. "my practice coordinates with youth, families, schools…") supportive of mental health practice. Items were modified from the AAP Mental Health Practice Readiness Inventory (2010) and represent community linkages, delivery system redesign, child and family support elements of the CCM.
Climate	A composite of staff members' experiential descriptions of "what" happens within a practice and how it effects their wellbeing (James & James, 1989; Ostroff et al., 2013; Schneider et al., 2013)	Operationalized as a 10-item scale that measures staff perceptions of climate dimensions identified by James & Sells (1981): role, job, leader behavior, workgroup, and organization
Technology	Built environment, tools, equipment, and other resources used by patients as they engage in health care and by staff as they carry out functions such as screening and diagnostic testing, care coordination, health information management, and way-finding	Operationalized as an index of 5 items indicative of the presence or absence of technologies (e.g. " I use psychosocial history and validated screening and assessment tools…") supportive of mental health practice. Items were modified from the AAP Mental Health Practice Readiness Inventory (2010) and represent decision support elements of the CCM.
Outer / Fixed Context	Characteristics of the external environment in which practices operate. To refer to relatively fixed organizational attributes such as patient volume that may affect implementation, but are not a direct target of the intervention, the word *fixed* is appended to *outer*.	Practice lead report of payer mix, health system affiliation, medical home and accountable care organization status, urban/suburban/rural, weekly patient volume, co-located specialists, prior QI experience, electronic medical records

Methods

Ohio Building Mental Wellness Intervention

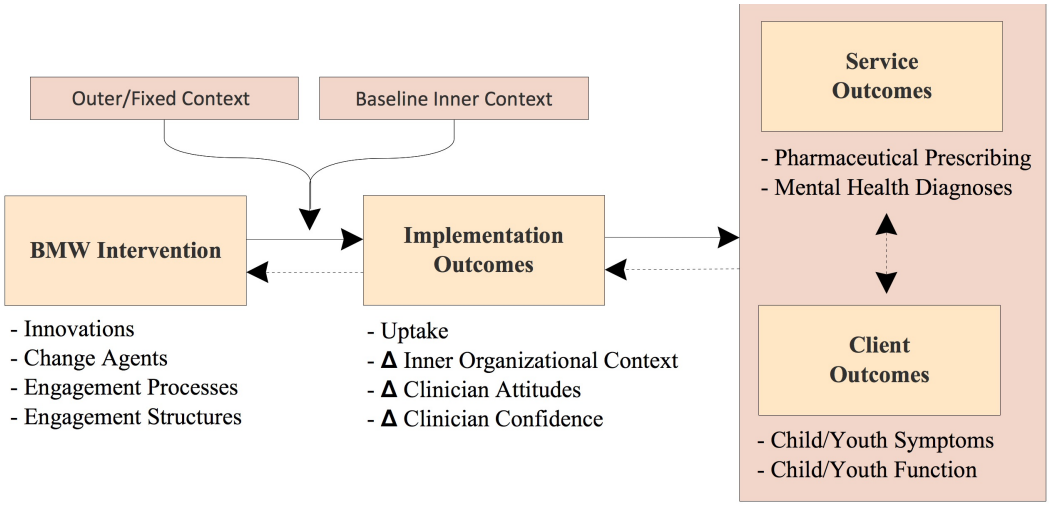
BMW Wave III was a learning collaborative intervention in which 29 Ohio-based hospital-, school-, and other community-based pediatric primary care and family medicine practices were engaged from 2013 to 2015. The aim of the intervention, which was coordinated by the American Academy of Pediatrics (AAP), Ohio Chapter, was to support pediatric primary care providers in implementing mental health services with the overarching goal of improving health outcomes for Ohio children and families. Intervention components targeted three "key drivers" of successful implementation (individual skills, organizational context, and integration) and change at both the individual and organization levels. **Appendix D** summarizes the components of the multifaceted intervention, described in greater detail by King (2016b).

Research Design

This analysis represents the second step in the theory-testing stage of a mixed-method study of Ohio BMW Wave III. Our proposed conceptual model reflects the premise that organizational context supports practice change by contributing to a therapeutic social environment through which staff motivation, effective services, and client recovery emerge (**Figure 5.1**). Proctor et al. (2011, 2009) put forth a theory for implementation research that forms the skeleton framework into which the conceptual model is nested. Prior research supported the hypothesis that the complex intervention was associated with **implementation outcomes** (e.g. uptake), **client outcomes** (e.g. diagnosis and prescribing) and **service outcomes** (e.g. child/youth symptoms and function) (King, 2016b). Robust uptake of the LC, combined with significant intervention effects and variation in organizational context across participating practices, provided the conditions needed to explore the mechanisms of these effects. Here, we test whether baseline inner context and outer/fixed context moderate the pathway between the intervention and implementation outcomes. Sample size precluded us from undertaking a mediation analysis to

test whether service outcomes and client outcomes were wholly or in part brought about by the intervention's effects on organizational context, a relationship to be tested in future research.

Figure 5.1: Conceptual model of the role of organizational context in BMW practice change



Our conceptual model illustrates the BMW intervention involving a process of active engagement across multiple system levels and change agents. An intervention is defined as a unique combination of **innovations** (e.g. "common factors"), **change agents** (e.g. pediatric practice staff), **engagement processes** (e.g. role-plays), and **engagement structures** (e.g. site visits). This represents a modification of Proctor's framework to reflect ideas proposed by Owczarzak et al. (2014), the National Coalition for Dialogue and Deliberation (2005), and Wilson (2004). We adopt Greenhalgh et al.'s (2004) definition of an innovation as "a novel set of behaviors, routines, and ways of working that are directed at improving health outcomes, administrative efficiency, cost effectiveness, or users' experience and that are implemented by planned and coordinated action." Practically speaking, these include the diverse mental health care practices and inner organizational context enhancements outlined in **Appendix D**.

Implementation of the BMW intervention is shown measured as a function of implementation outcomes, including uptake and changes in inner organizational context, clinician confidence, and clinician attitudes. May (2013) submits that innovations are embedded through social mechanisms that are shaped by organizational context. This context affects whether an

innovation is adopted, and if implemented, whether it is modified to fit the organization or vice-versa (Glisson, 2002). Since the reciprocal effect of inner context on the BMW intervention is not being tested, the relationship is represented by a dotted arrow.

Higher baseline inner context scores were hypothesized to positively moderate implementation outcomes, with the exception of change in inner context, which was hypothesized to have a negative relationship (where those with higher baseline scores face ceiling effects and those with lower baseline scores have room to improve). A preliminary revised Pediatric Primary Care Office Inventory ("Office Inventory") tool was developed as a measure of a practice's inner context (King, 2016a). Culture and climate items were developed to reflect values, artifacts, and perceptions that empirical research has shown are related to implementation outcomes such as uptake of evidence-based practices and interventions; staff outcomes such as mental health, job satisfaction, and turnover; service outcomes such as mental health care delivery and continuity of care; and client outcomes such as improvement in child mental health. Structure/processes and technology items in turn mapped to components of the chronic care model (CCM) (Coleman, Austin, Brach, & Wagner, 2009; Wagner et al., 1996), and represent the infrastructure for mental health care delivery. Higher scores, which reflect a more positive context, and higher inter-rater agreement, which reflects a stronger context, are hypothesized to have a positive association with implementation outcomes. Research has shown that low agreement in staff perceptions of context is detrimental to individual and organization change in primary care (Dickinson et al., 2014).

The following are the aspects of outer/fixed context measured and our hypotheses about their associations with implementation outcomes: A high percent of publicly-insured patients was hypothesized to have a negative association, given potentially greater barriers to mental health service reimbursement in primary care settings for Medicaid patients and for school-based health centers, which in our sample all had high percent publicly-insured (Center for Integrated Health Solutions, 2014; Mauch et al., 2008). These practices were also expected to serve clients with higher acuity of need, given the link between poverty and health (Berkman & Kawachi, 2000).

Accountable care organization (ACO) accreditation was expected to have a positive association, given the greater emphasis on payment models that reward outcomes, in contrast to traditional fee-for-service models, which present financial disincentives to mental health service provision in primary care (Meadows et al., 2011; O'Donnell et al., 2013). Prior research suggests that existence of a co-located mental health specialist would also have a positive association (Chang et al., 2013; Pfefferle, Gittell, Hodgkin, & Ritter, 2006). Resource dependency theory might suggest that affiliation with a health care system, a proxy for organizational relationships, and high weekly patient volume, a proxy for organization size, would positively relate to implementation outcomes (given pre-existing infrastructure and degree of resource reserve, respectively) (Goldberg & Mick, 2010). However, group cultures tend to predominate in primary care (Dowswell, Harrison, & Wright, 2001), and to the extent that being part of a larger organization or system might influence values to be less group-oriented (i.e. less flexible), these factors may also be detrimental. Curoe, Kralewski, & Kaissi (2003) have demonstrated that "as the size of the group practice increases the culture is less collegial, less cohesive (less internal agreement on how to do things), and there is less organizational trust" (p. 396). Likewise, Shortell et al. (1995) suggested that "implementing quality improvement efforts may be difficult in more larger-size hospitals due to the larger number of organizational levels and greater complexity of operation" (p. 383) and demonstrated that "implementing quality improvement work in larger-size hospitals with more bureaucratic cultures is a difficult task" (p. 397). Thus, no hypothesis was made for these two variables. Prior QI experience was expected to have a positive association, since there would be familiarity with the process of a Breakthrough Series. EMR represents an "object" through which staff coordinate and share information (Okhuysen & Bechky, 2009), and was hypothesized to have a positive association. At last, rural practices were hypothesized to have a negative association with implementation outcomes, given geographic barriers that they face to community linkages and decision support.

Participants

While BMW was itself a quality improvement project, components of its evaluation – including survey measures of inner context (Office Inventory), outer/fixed context (BMW Registration Form), clinician attitudes (Office Inventory), and clinician confidence (Clinician Confidence Forms) – were approved as human subjects research by the Nationwide Children's Hospital IRB (IRB13-00397). Twenty-nine practices enrolled in BMW and three later dropped out. Eleven of the 29 practices were school-based health centers (SBHCs) who reported their data as one of three teams (preschool to 6th grade, preschool to 8th/12th grade, and high school only). This had ramifications for data analysis, which with the exception of program uptake, took into account three SBHC practice clusters. The designated practice lead completed a single BMW Registration Form for his/her practice. The sampling frame for the Clinician Confidence Forms was all physicians and nurse practitioners participating in site visits, and n=65 participated at pre and n=52 participated at post (~100% participation). The sampling frame for the Office Inventory was all staff at enrolled practices, including those staff not directly participating, and 240 participated at pre and 165 participated at post. This represents approximately 78% participation at baseline and 53% participation post-intervention. The distribution of roles for respondents from the 17 practices that participated in the Office Inventory at both time points are displayed in **Table 5.2**. Distribution of roles was very similar at baseline and post-intervention.

Table 5.2: Roles self-reported in Office Inventory at baseline and post-intervention

Role	Pre	Post
Social Worker	2 (0.90%)	1 (0.61%)
Physician	38 (17.04%)	29 (17.58%)
Nursing Assistant	2 (0.90%)	6 (3.64%)
Nurse Practitioner	25 (11.21%)	21 (12.73%)
Registered Nurse	42 (18.83%)	25 (15.15%)
Other Clinical Staff	53 (23.77%)	44 (26.67%)
Non-Clinical Staff	61 (27.35%)	39 (23.64%)
Total	223 (100%)	165 (100%)

The SBHCs were within a single urban area and the remaining practices were in urban (n=6), suburban (n=8) and rural (n=4) areas. Twenty-two practices reported being affiliated with a health system, and based on reports by BMW practice leads, three were part of an accredited ACO and three were certified by NCQA as a PCMH prior to the intervention. The majority (n=22) reported past experience with QI projects generally, and four reported that this project experience was related to mental health specifically. All but three practices reported using EMR to track patient progress and/or outcomes. Each of the 18 non-SBHCs served on average 314 patients per week (range: 75 to 775) and had on average 15 total staff (range: 6 to 45), six of whom were pediatricians or nurse practitioners (range: 2 to 30). Half (n=9) reported having one or more specialists (psychiatrist, psychologist, counselor, social worker) co-located. Volume and staffing statistics were not reported for the SBHCs individually. Of the 18 practices that completed the Learning Collaborative, all but three reported accepting uninsured patients, and the average percent of publicly-insured patients reported was 57% (range: 25 to 98%).

Measures

Inner Organizational Context. The practice environment was assessed using a preliminary version of the revised Pediatric Primary Care Office Systems Inventory ("Office Inventory"), which has demonstrated adequate reliability and validity as a measure of aspects of inner context that support mental health service implementation (King, 2016a). Items in three domains were measured on an ordinal scale were 1 is strongly disagree and 10 is strongly agree, including office structures/processes (15 items); office culture (6 items); and office climate (10 items). These scores were then converted to a percentage, ranging from 0 to 100%. Office technologies was measured on a continuous scale of percent agreement across 5 dichotomous items rated 0 for disagree or 1 for agree. Average to high within-practice inter-rater agreement (IRA), combined with moderate to strong between-practice differences (ICC type 1), supported aggregation of domains to the practice level (see King, 2016b, for details). A referent-shift consensus model was

used to aggregate responses to the culture and systems/structure domains, and a direct consensus model was used to aggregate responses to the climate and technology domains. A total inner context score was calculated for each practice as an average of the four domain scores.

Inter-Rater Agreement (IRA). The $r_{WG(J)}$ index, developed for assessing agreement when a group of judges (staff) rate the same target (practice) on multiple parallel items (James et al., 1984, 1993), was used to measure within-practice IRA on each inner context domain. The index represents the reduction in variance reflected if one compares the average observed variance in staff scores across items to the variance one would expect if there were complete lack of agreement. It ranges in value from 0.00 (no agreement) to 1.00 (perfect agreement).

Percent Group/Developmental. The culture of the practice environment was additionally assessed using an application of the competing values framework (CVF) included in the Office Inventory (Kimberly & Quinn, 1984). The CVF places organizations on a continuum of four culture types: human relations model (*group*); open systems model (*developmental*); internal process model (*hierarchical*); and rational goal model (*rational*). Each type varies on "competing values," which include internal vs. external focus; stability vs. flexibility; and different means (e.g. flexibility vs. planning) and ends (e.g. growth vs. productivity) (Cameron et al., 2014; Quinn & Rohrbauch, 1983). Respondent were asked to distribute 100 points across five sets of statements, where there is one statement in each of the fives sets reflecting each cultural value. The average percent of points assigned to "group" and "development" values in each practice was then calculated.

Outer/Fixed Organizational Context. Nine measures of outer/fixed context at baseline were incorporated, including high percent of publicly-insured patients (dichotomous, 0 or 1); health system affiliation (dichotomous, 0 or 1); patient-centered medical home status (dichotomous, 0 or 1); accountable care organization status (dichotomous, 0 or 1); geographic location (categorical,

0=urban, 1=suburban, 2= rural); practice's weekly volume (continuous); one or more specialists (psychiatrist, psychologist, counselor, social worker) co-located (dichotomous, 0 or 1); prior experience with a quality improvement project (dichotomous, 0 or 1); and use of electronic medical record to track patient progress and/or outcomes (dichotomous, 0 or 1). The breakpoint for high vs. low/average percent of publicly-insured patients of 30% or more was based on inspection of the metric's distribution and AAP survey data (AAP Department of Practice, 2012). A breakpoint for high vs. low/average practice volume was also assigned based on whether a practice's weekly and/or yearly volume was one standard deviation above the LC mean.

Clinician Attitudes. Clinician attitudes relating to psychosocial aspects of care were rated on a continuous scale of 14 to 70 using a version of the Physician Belief Scale developed by Ashworth, Williamson, & Montano (1984) and modified by McLennan et al. (1999) and included in the Office Inventory. They were also rated on a continuous scale of 8 to 40 using the Beliefs and Feelings Subscale and a continuous scale of 6 to 30 using the Burden Subscale.

Clinician Confidence: Clinician self-rating of confidence using "common factors" strategies for building therapeutic relationships with clients and "practice elements" for symptoms of low mood were rated on a continuous scale of 1 to 4, obtained by averaging ratings across 21 Likert-type items presented in the Clinician Confidence Form. These items were rated 1 to 4, where 1 is very confident, 2 is somewhat confident, 3 is not very confident, and 4 is not at all confident.

Uptake. Activities undertaken to employ BMW were measured as a function of implementation in five categories: resources, tracking, screening, engagement and brief intervention, and integration. Uptake was rated on a continuous scale of 0 to 16 (number of activities rated implementing or sustaining) and as a Likert item ranging from 0 to 5 (number of stars achieved) using the BMW Star Recognition System. Star recognition was a means for practices to monitor

uptake of BMW through a series of 16 questions about implementation activities. Practices rated these items with their QI coordinators on a scale of 1 to 4, where 1 is no testing, 2 is testing, 3 is implementing, and 4 is sustaining. When all activities for a category were rated 3 or 4, a star was achieved. Progress in achieving aims through PDSA cycles was additionally measured using the Assessment Scale for Collaboratives (IHI, 2004) to help assign final uptake status. Practices' relative progress was monitored by the core BMW team on a monthly basis, and a final assessment was made at the end of the LC. A status of "leading," "average," "lagging," or "dropped out" was assigned by the author to denote level of uptake based on inspection of metrics' distributions. In cases where a practice's scores placed it at or near a cut-point, the core BMW team discussed their observations and assigned the most appropriate status.

Data Analysis Plan

Effects of the intervention on implementation outcomes were briefly summarized from previous work (King, 2016b). Relationships between practices' baseline inner context scores and changes in inner context were assessed through correlations, as were relationships between inner and outer/fixed context variables and baseline values of our implementation outcomes.

Inner context and clinician attitudes were both measured using the Office Inventory, allowing individual scores to be linked. This enabled us to assess whether there was an association between attitudes and any facets of context at baseline *and* whether these associations might have been brought about by the "contextual" or normalizing effect of the environment on individuals. We hypothesized that more positive psychological climate (individual level) and organizational climate (organization level) would be associated with more positive attitudes at baseline, as demonstrated in the seminal work of James & Sells (1981) and Glisson & James (2002). We used a linear mixed-effects model with random intercepts to regress individual clinician attitudes on individual psychological climate ("within effect") and organizational climate ("contextual effect"). One might argue that a significant "contextual" effect could occur if

practice-average climate were acting as a proxy for other key organizational variables or if climate is measured with error and this error contains information related to attitudes. Since we believe our climate domain to be a reasonably reliable and valid measure of climate, and the contextual effects we hypothesize are supported by prior research, it would seem reasonable to believe that a significant "contextual" effect supports our hypothesis of a normative effect of the work environment on individuals. If climate *were* to any extent act as a proxy for other organizational variables, this would still support our overall premise that organizational context has a normative effect on individual attitudes and behavior.

Although overlapping staff participated in the Office Inventory at baseline and post, there were no identifiers connecting responses at each time point. Clinician Confidence Forms, conversely, included an identifier and clinician scores were linked from baseline to post. Change in clinician attitudes was therefore measured as a change score at the practice level, whereas change in confidence was measured as a change score at the clinician level. To test the role of inner context in moderating the effects of the intervention on implementation outcomes, and to explore the hypothesized associations between our independent variables and implementation outcomes, change in clinician attitudes (practice level), uptake (practice level), and change in clinician competence (clinician level) were modeled as a function of practice baseline inner context, IRA, percent group/developmental, and outer/fixed context (practice level). For clinician confidence, linear (mixed) effects models were used to account for clustering of staff by practice to obtain valid inferences; even low intraclass correlation (i.e. small percent of variation in outcome attributable to differences between practices) can have a significant impact on test statistics. Linear regressions of implementation outcomes on inner context domains, followed by assessment of variance inflation factors, confirmed the presence of collinearity among inner context domains. Thus, for all multivariable models that include inner context, outcomes were regressed on total inner context score. Associations between outcomes and individual domains were assessed through simple linear regression.

In using a change score analysis, as opposed to regressing post score on our independent variables plus baseline score, we are asking whether we can reject the hypothesis of no association between our independent variables and change in attitudes or confidence, as opposed to a hypothesis of no association *given that they have the same baseline values* of attitudes and confidence. It is the research question of how inner context, in general, affects degree of BMW implementation that we seek to answer, and change scores provide an unbiased estimate of this (Fitzmaurice, Laird, & Ware, 2011; Smolkowski, 2013).

In addition to testing moderators quantitatively, Boolean or "set" logic was used to identify outer/fixed context characteristics or combinations thereof that are necessary or sufficient for a particular outcome, a method informed by the work of Thygeson, Peikes, & Zutshi (2013). Specifically, a case-oriented approach to comparing across practices known as qualitative comparative analysis (QCA) was employed to explore the association between a practice's outer/fixed organizational context and intervention uptake. QCA is emerging as a popular method for evaluating health interventions when sample size is modest (10 to 20 cases); data is both qualitative and quantitative; and there is "causal complexity" where multiple *combinations* of characteristics are associated with an outcome, even when statistical methods will fail to reject the hypothesis of no association for *individual* characteristics (Kahwati, 2013). QCA is a computer-assisted means of comparing configurations of variables whose relationships with an outcome of interest are theoretically supported, with the goal of illuminating potentially-important combinations. Unlike statistical analysis, which allowed us to estimate the average association between outer context and uptake for all cases, QCA helped us to visualize what predictors are necessary or sufficient for a particular status to be achieved on a case-by-case basis, allowing for multiple solutions. Rihoux & Ragin (2009) emphasize that QCA, based in the logical tradition of John Stuart Mill and Karl Popper, does not prove causation, but does aid in quickly eliminating "irrelevant factors" (p. 3) and "theories that are unable to discriminate correctly between cases with and without the outcome under study" (p. 10).

We compared across the six practices "leading" in uptake and six practices "lagging" in uptake to visualize different "paths" or configurations that led to a particular uptake status. Our categorical outer/fixed context variables (see *Measures*), all of which are categorical, lent well to conversion to dichotomous sets. This enabled us to use a QCA technique known as crisp-set qualitative comparative analysis (csQCA), which proceeded in three steps: First, thresholds were justified based on the scientific literature and inspection of the each variable's distribution for BMW Wave III practices, with attention paid to avoiding breakpoints that would assign practices with very similar scores to different sets (see *Measures*). Second, csQCA was used to generate a truth table of configurations or combinations of characteristics associated with being a practice whose uptake status is "leading" or "lagging." Third, a technique known as Boolean minimization was used to derive a minimal formula containing "one or more terms, each of which covers a number of cases with the outcome, while no cases with a different outcome are explained by any of the terms in the minimal formula" (Rihoux & Ragin, 2009, p. 70). The result is a list of necessary (common to all "leading" or "lagging" practices) and/or sufficient (common to one or more "leading" or "lagging" practices) combinations of characteristics. We repeated these methods twice to identify the most parsimonious combinations of characteristics that led to each outcome ("leading" or "lagging"). The generation of "truth tables" and "Boolean minimization" was accomplished using fsQCA (Ragin, Drass, & Davey, 2006), one of many free QCA software now available (Thiem & Duşa, 2013).

Theory was of central importance at all stages of the analysis: Choice of variables was informed by *a priori* hypotheses (see *Research Design*), and sense-making of solutions was informed by interview narratives (King, 2016c), re-contacting of qualitative interview participants, and dialogue and deliberation among the core BMW implementation team.
All members of the team were asked to review qualitative interview and Boolean analysis results side-by-side and provide responses to the following questions:

- **Which combination of 3-4 traits (or lack thereof) do you think most "leading" practices had in common?** Could you please describe one example of these traits facilitating a practice's success? What did you do differently for this practice to help build on strengths or address weaknesses? Knowing what you do now, what might you do to support a practice with these traits in the future?
- **Which combination of 3-4 traits (or lack thereof) do you think most "drop-out" or "lagging" practices had in common?** Could you please describe one example of these traits holding a practice back? What did you do differently for this practice to help build on strengths or address weaknesses? Knowing what you do now, what might you do to support a practice with these traits in the future?

Results

Inner organizational context domain scores at baseline and post-intervention are displayed in **Appendix G**, reproduced from earlier work (King, 2016b). Across the practices that participated in the Office Inventory at both time points (n=17), baseline scores were on average 68% for *culture* (95% CI: 63 to 72%); 63% (95% CI: 59 to 67%) for *structure / processes*; 64% for *climate* (95% CI: 62 to 67%); and 63% for *technology* (95% CI: 55 to 71%). Average IRA was moderate to very strong in all but one of these 17 practices, and distribution of points across the CVF was not uniform, as evidenced by an average Blau index of .65 (min: .55 max: .74 median: .66) and an average of 58% of points assigned to group and developmental characteristics (min: .41 max: .76 median: .56). Implementation outcomes, without controlling for potential moderators and reproduced from King (2016b), are summarized in **Appendix H**.

There was a negative correlation between a practice's baseline culture and change in culture ($r=-0.68$, $p=0.003$, $n=17$); baseline structure/processes and change in structure/processes ($r=-0.73$, $p<0.001$, $n=17$); baseline climate and change in climate ($r=-0.12$, $p=0.657$, $n=17$); and baseline technology and change in technology (-0.870, $p=0.000$, $n=17$). Practices in rural

locations had more negative inner context scores at baseline and smaller changes in inner context over time. Practices in urban areas, accredited ACOs, and those with a co-located mental health specialist at the start of the LC experienced greater changes in inner context over time.

Clinician Attitudes

Clinicians' total PBS scores decreased on average 11% (95% CI: -20% to -1%) from baseline to post-intervention in practices that participated in the Office Inventory at both time points (n=17). Burden domain scores decreased on average 13.3% (95% CI: -25.5% to -1.1%) and belief/feeling domain scores decreased on average 8.0% (95% CI: -18.9% to +2.8%). Visualization of baseline practice-level data (n=20) revealed that practices where clinicians reported more positive attitudes toward psychosocial aspects of care also had more positive staff reports of inner context going into the Learning Collaborative (**Figure 5.2**). Practices scoring at or below the average inner context score of 50% at baseline saw robust improvement in attitudes, but as baseline inner context scores exceeded the average, improvement in attitudes rapidly approached zero or crossed over to a slight worsening of attitudes (**Figure 5.3**).

Figure 5.2: Relationship between practice-average clinician attitudes and baseline inner context

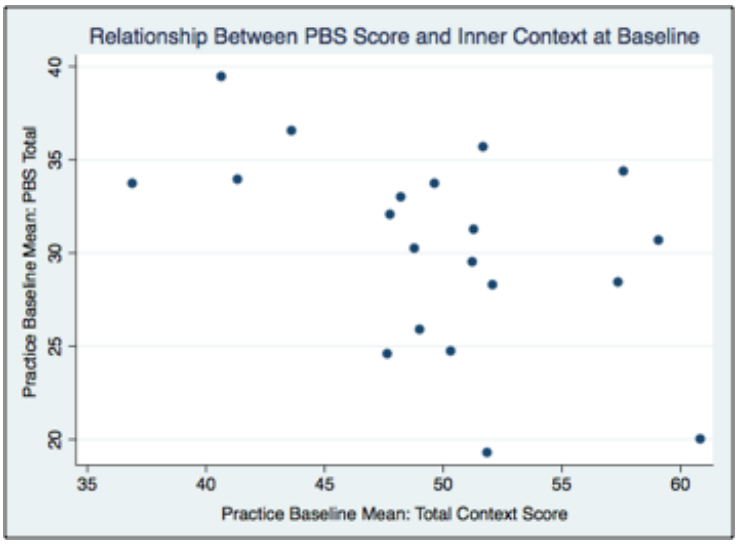
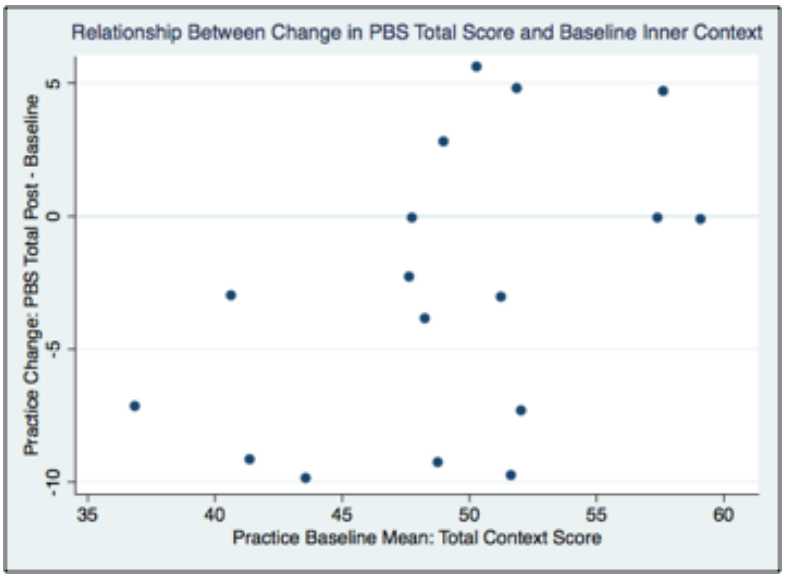


Figure 5.3: Relationship between change in practice-average clinician attitudes and baseline inner context



A linear mixed-effects model with random intercepts for practice was used to regress individual PBS burden and belief/feeling scores on both individual psychological climate score ("within effects") and organizational climate score ("contextual effects"), using data from 86 clinicians associated with 16 practices at baseline (the four practices whose climate IRA scores indicated disagreement were discarded). A ten-percentage-point increase in climate was associated with a 1.80-point decrease (95% CI: -2.56, -1.03) in PBS burden score and 2.19-point decrease (95% CI: -2.94, -1.44) in PBS belief/feelings score, indicating more positive attitudes (p=0.000). Thus, if we consider two clinicians within the same practice whose psychological climate scores differ by 10 percentage points, the clinician with the higher psychological climate score is expected to have a PBS domain score that is about two points lower than that of the other clinician. Contextual effects reached significance for the burden domain only. If we consider two clinicians with the same psychological climate score, but who come from practices that differ in organizational climate score by 10 percentage points, the clinician from the practice with higher organizational climate score is expected to have a PBS burden score that is 2.03 points lower (95% CI: -3.76, -0.293) than that of the other clinician (p=0.022).

No outer/fixed context variables showed a strong correlation with attitudes at baseline. In simple linear regressions of change in PBS total score on baseline inner context, outer/fixed context, IRA, and percent group/developmental, summarized in **Table 5.3**, payer mix was significant. Practices with a low/average percent of publicly-insured patients (n=6) at baseline experienced an estimated 8.41-point reduction (95% CI: -12.2, -46.3), or in other words improvement, in PBS total score from baseline to post-intervention (p=0.000). Practices with a high percent of publicly-insured patients (n=11) experienced a mere half-point improvement in attitudes, which is 7.95 points less (95% CI: 3.45, 12.4) improvement than those with low/average percent publicly-insured (p=0.002). Baseline structure/processes and total context score also reached significance, but coefficients were very small in magnitude, with a one percentage point increase in structure/processes being associated with 0.291 points (95% CI: 0.028, 0.553) less improvement in attitudes (p=0.032) and a one percentage point increase in total context score being associated with 0.433 points (95% CI: 0.00778, 0.858) less improvement in attitudes (p=0.046).

Uptake

Uptake was variable among the 18 practices that completed the Learning Collaborative, with practices earning an average of three stars (min: 1 max: 5) (**Figure 5.4**). Practices were fairly evenly split between three levels of uptake: "leading" (n=7), "average" (n=6), and "lagging" (n=5). Among the 15 practices that submitted ratings for continuous star score (minus the three SBHC groups), average continuous star score was 62 (min: 53 max: 68 median: 65 SD: 5.46). A scatterplot of total context score and continuous star score illustrates the positive relationship that we found between inner context and uptake (**Figure 5.5**). Results of single ("crude") and multivariable ("adjusted") linear regressions with robust standard errors used to assess the relationship between continuous star score and baseline inner context, IRA, percent group/developmental, and outer/fixed context and are presented in **Table 5.4**. A coefficient of

.649 (95% CI: 0.179 to 1.12) in the adjusted model of uptake suggests that, based on our small sample of 15 practices, a ten-point increase in total context score at baseline corresponds to a 6.49-point increase in continuous star score (p=0.019). This increase is more than one full standard deviation on the continuous star scale and is evidence of a moderating effect of context on intervention uptake. Results of the adjusted model also show that a high percent of publicly-insured patients is associated with a 7.35-point reduction (95% CI: -13.6, -1.14) in continuous star score (p=0.030). Results of crude models show that PCMH status; use of EMR to monitor patient outcomes; higher culture, structure/processes, and technology scores; and more group / developmental cultures were associated with increased uptake. A coefficient of 0.200 (95% CI: 0.037, 0.363) for percent group/developmental in the crude model of uptake suggests that a 10-point increase in points assigned to group/developmental baseline in the CVF is associated with a 2.0-point increase in continuous star score (p=0.020).

Figure 5.4: Illustration of the variability in uptake among BMW-participating practices

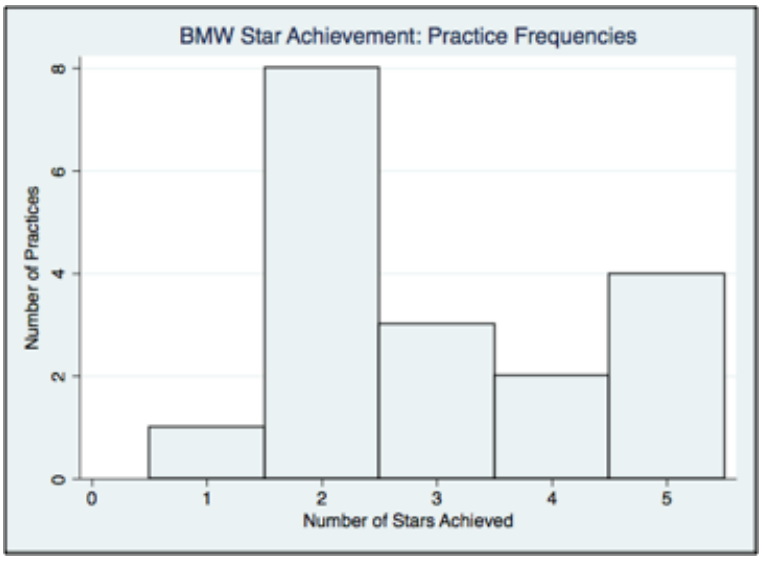
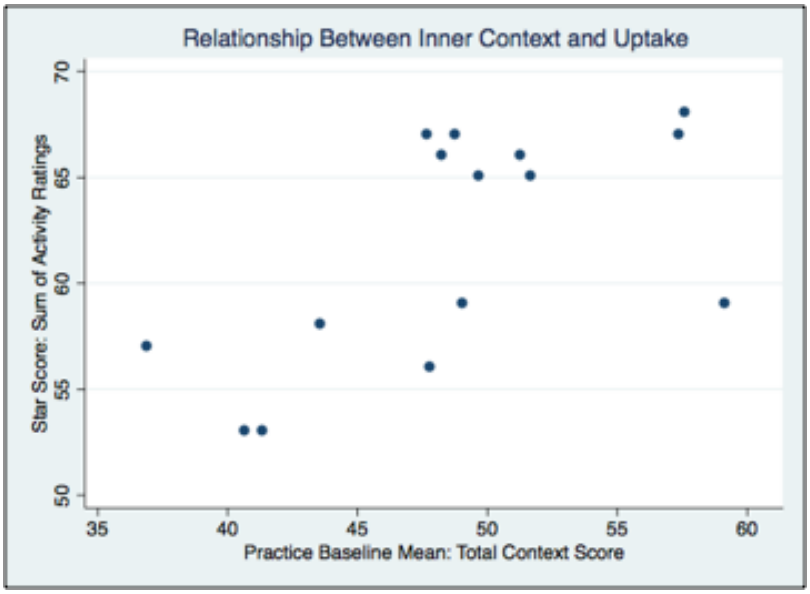


Figure 5.5: Relationship between BMW intervention uptake and baseline total context score



Results of csQCA revealed three parsimonious combinations of outer/fixed context characteristics that were sufficient for achieving "leading" uptake status. These are having a low/average percent of publicly-insured *and* no co-located mental health specialist; a high percent of publicly-insured *and* the existence of a co-located mental health specialist; and electronic medical record *and* no health system affiliation. Combinations sufficient for achieving "lagging" status were no electronic medical record; low/average percent of publicly-insured *and* co-located mental health specialist; and high percent of publicly-insured *and* no co-located mental health specialist *and* health system affiliation. These csQCA results corroborate linear regression findings that EMR is associated with increased uptake. They also show that in our sample, when there was no co-located mental health specialist, a high percent of publicly-insured patients was damaging to uptake. This was not the case, however, when a practice did have co-location. *Lack of* health system affiliation led to *high uptake* in cases where a practice had an EMR, and affiliation with a health system led to *low uptake* when a practice also had a high percent of publicly-insured patients and no co-located mental health specialist. No single criteria was found to be necessary for "leading" or "lagging" status.

Confidence

The average change in confidence experienced by clinicians over the course of the Learning Collaborative was 0.63 points (95% CI: 0.47, 0.79). **Table 5.5** summarizes the results of single ("crude") and multivariable ("adjusted") mixed effects linear regressions of change in confidence on baseline inner context, outer-fixed context, IRA, and percent group/developmental. Since no weekly volume data was reported for the three SBHC practice clusters, and only four SBHC clinicians completed confidence assessments, SBHCs were excluded and 14 practices and 48 clinicians were included. EDA revealed four influential points and a very slight non-normality of the distribution of clinicians' change in confidence. Robust standard errors were therefore used to account for any violation of the normality assumption and models were run with and without influential points.

While some positive and significant relationships between inner context and change in confidence were found, they were very weak. In both adjusted and crude models, with and without influential points included, practices that achieved PCMH certification prior to enrollment had practice-average change in confidence that was about a point higher than those without certification (95% CI Adjusted: 1.10, 1.99 Crude: 0.369, 0.706). In adjusted models both with and without influential points, practices that were in rural areas had practice-average change in confidence that was about a point lower than those in urban areas (95% CI Infl. Points: -1.54, -0.0279 No Infl. Points: -1.04, -0.352).

Two additional elements of outer/fixed context had significant and strong relationships with practice mean change in confidence in the adjusted model excluding influential points. Practices that had a co-located mental health provider had practice-average change in confidence that was about a third of a point higher than those without one (95% CI: 0.0996, 0.501), and practices that had past experience with QI projects had practice-average change in confidence that was about a point lower than those with no prior experience (95% CI: -1.08, -0.522).

Discussion

While organizational context is not something that can always be seen, providers witness its effects every day, whether through its influence on the uptake of new practices, such as mental health promotion, or the extent to which these practices translate into patient health outcomes (King, 2016a). This study illustrates how these more general aspects of care can play a role in shaping the attitudes of pediatric primary care providers toward mental health, their capacity to build skills and confidence, and the ability of teams to complete a task as complex and challenging as a Learning Collaborative (LC).

Sample size represents a major limitation of this study that should be discussed up-front. Sample sizes for our analyses of the moderating effects of organizational context on practice-average change in attitudes (n=17) and uptake (n=15) were very small. This poses potential issues with external validity (is our small sample representative of the larger population) and internal validity (do our statistical assumptions hold). With regard to external validity, while we recognize that we have a small sample of Ohio practices that self-selected to participate in BMW Wave III, our sample is diverse, and we explicitly measure and control for this diversity with our organizational context variables. With regard to simple linear regression, as Student (1908) demonstrated, when basic statistical assumptions are met, then one can make reasonable inferences using a sampling distribution that takes into account the fact that as a sample becomes smaller, its standard deviations increase and its mean deviates more widely from the true population mean. What becomes the primary issue for internal validity for us, then, is power. To detect an effect of total context score on change in PBS burden score of 2 points, our power is only about .70, and to detect an effect of total context score on continuous star score of 2 points, our power is only about .34. Power is defined as the probability of rejecting the null hypothesis of no effect of context when the null is false. A power of .80 is conventionally proposed (Cohen, 1988, 1992); any less and our risk of failing to reject the null if in fact the effect of context is real exceeds 20 percent. Despite our low power, we detected some significant moderating effects of

context. The problem is that in underpowered studies, the likelihood that a significant coefficient represents a true effect is lowered, and the magnitude of significant effects tend to be inflated, making the reliability of findings based on these results alone a concern (Button et al., 2013). In this discussion, we focus qualitatively on the general direction of any significant effects and do not take an insignificant coefficient to mean that a variable was not important. It is meaningful that results of QCA show that combinations of characteristics shown in our regression analysis to be significant, and that were hypothesized based on empirical literature to be important to uptake, were sufficient to predict uptake in our sample. Interviews with participants provided additional, qualitative evidence that context shaped staff's experiences with engaging in BMW activities and taking on new mental health care tasks. Our mixed-method approach therefore represents a major strength of this study that serves to enhance the validity of quantitative findings relating to the moderating effects of context on uptake and attitudes.

Taken together, findings supported the hypothesis that inner context is a moderator of implementation outcomes. Clinicians in practices with above-average context scores at baseline tended to have and maintain positive attitudes, and when perceptions of inner context were low to start, so too were attitudes – although these attitudes were likely to improve over time. This finding that attitudes and context relate is corroborated by organizational behavior theory describing "a continuing reciprocal interaction between psychologically meaningful and significant perceptions of the environment, on one hand, and emotional (affective, evaluative) responses to the environment and behaviors in the environment, on the other" (James & Sells, 1981). Thus, it is not surprising that we found both higher inner context scores and more positive attitudes to be associated with intervention uptake. While practices that scored lower on these domains had a harder time completing program activities, the improvements they made in attitudes and inner context lifted them close to where their peers began.

We delved deeper to understand whether it was an individual's perception of the practice environment (psychological climate) that influenced her attitudes or staff consensus on what the

environment was like (organizational climate). Organizational climate exerted both "within" and "contextual" effects on attitudes, meaning it is both a clinician's personal experiences with mental health care *and* the climate produced by the experiences of those around her that influenced her participation in BMW activities. This is in line with earlier research by Glisson & James (2002), who demonstrated an association between culture and climate at the team level and work attitudes at the individual level in child welfare and juvenile justice settings. The key finding that a poor organizational climate could negatively influence the behavior of a staff member with otherwise positive attitudes underscores the value of an all-staff intervention. BMW Wave III intervened with context by encouraging staff at all levels of the organization to participate in site visits, where they worked on communication skills and preparing the office, and through Breakthrough Series, where participants were invited to address elements of context identified in surveys. The Office Inventory survey helped teams to gauge how their inner context for mental health care implementation compared to that of their peers. It was therefore an opportunity for staff to initiate dialogue about their practice environment; take stock of strength and weaknesses; and to identify action items for creating a context that is favorable to mental health.

Taken together, findings also supported the hypothesis that outer context is a moderator of implementation outcomes. Elements of outer/fixed context that were found to have a significant association with implementation outcomes include PCMH status (↑ uptake, ↑ change in confidence), use of EMR to monitor patient outcomes (↑ uptake), percent group/developmental (↑ uptake), high percent publicly-insured (↓ uptake, ↓ change in attitudes), rural location (↓ change in confidence), past QI experience (↓ change in confidence), and co-located mental health specialist (↑ change in confidence). Boolean analysis corroborated statistical findings, with absence of EMR being sufficient criteria for "lagging" uptake status. Boolean findings also showed that, in our sample, a lack of health system affiliation was helpful to uptake when practices had ample internal resources such as EMR, but harmful to uptake when a practice had a high percent of publicly-insured patients and no co-located providers. While

statistical analysis suggested a negative association between high percent of publicly-insured and uptake, csQCA showed that in our sample, it is actually the combination of payer mix and co-location that mattered to uptake. Specifically, high percent of publicly-insured led to "lagging" status in practices without a co-located mental health specialist (and health system affiliation) and to "leading" status in practices with a co-located mental health specialist. Likewise, low/average percent of publicly-insured led to "lagging" status in practices with co-location and "leading" status in practices without co-location.

Most relationships found in our analyses were in the hypothesized directions. Practices identifying as a PCMH had more supportive structures/processes and technologies, such as community linkages and decision support, in place from the start. Likewise, we expected EMR to support uptake by enabling coordination and information-sharing, and it is also possible that having EMR in place from the start was a marker for past success with organization change. That those with more group and developmental-oriented cultures or greater cross-role consensus would experience more robust uptake and confidence-building was also expected. Group-oriented values that foster sharing and integration of ideas and opinions across roles have for example been positively associated with job satisfaction (Brazil, Wakefield, Cloutier, Tennen, & Hall, 2010), participation and teamwork (Hann, Bower, Campbell, Marshall, & Reeves, 2007), and team climate (Howard, Brazil, Akhtar-Danesh, & Agarwal, 2011) in pediatric primary care. While practices with high percent of publicly-insured had a harder time with uptake on average, we made the promising finding that in practices caring for underserved populations, co-location can lend helpful resources and infrastructure for achieving success. On the other hand, we found that potential benefits of health system affiliation may be outweighed by negative consequences to culture (e.g. less emphasis on flexibility and growth and more emphasis on stability and rule-following). This was reinforced by Boolean results showing that in practices with EMR (and therefore greater internal resources), health system affiliation was damaging to uptake.

The finding that practices still attained "leading" status when they had both high percent of publicly-insured and a co-located mental health specialist makes sense in light of evidence that co-location might address what Meadows et al. (2011) described as the "time and reimbursement dilemma," allowing additional time to be spent counseling patients while at the same time increasing the likelihood that mental health services will be adequately reimbursed (p. 452). A physician from an "average" uptake practice with a very high percent of publicly-insured (98%) said she felt that co-location would have been beneficial. She said that seven years prior, when she worked in a private practice, she treated ADHD herself. Now, she was more reliant upon specialists to assist her in light of patients' more complex needs and limited resources:

> "There are lots of mental and physical tolls on these children: They don't have a lot of stability, moving from home to home, witnessing people die, shot, murdered...a lot of what they have is PTSD, depression, acting-out issues because of what they've seen and how they've been treated," she explained. "I decided I was going to refer to mental health groups, because I felt our patients would benefit so much more…they could get the counseling as well as see the psychiatrist…they work with the teacher, they work with the parent, so it's much more comprehensive care. The problem is the system is very overwhelmed. And we don't have any psychologists on-site. We always have to refer out."

A few relationships ran counter to our *a priori* hypotheses. What do we make of the finding that co-location led to "lagging" status in practices with low/average percent of publicly-insured or that past experience with QI would be damaging to confidence-building? A medical assistant from a "lagging" practice with co-location and low/average percent of publicly-insured, when reflecting upon these findings, said that the same issue of communication that had created a barrier to referral to providers in the community also created barriers to referral in-house. "It's all in the hand-off procedure, the communication," she said. "Reaching out to them, getting the head contact people…setting up meetings and getting information, what their resources were and what their services were and how they could help our patients." She said that she and her co-workers didn't know the specialists in her building well, and it wasn't until BMW that they began reaching out and coordinating to create the experience of a "warm hand-off" for families. The office coordinator from a "leading" practice with co-location and high percent of publicly-insured

said that from the start of BMW, they had specialists in their hospital's psychiatry department and in a counseling group in an adjoined building, but that it was difficult "trying to get into those [hospital] resources," and that as for the group a block away, "sometimes just going that far is a barrier." She reported some success with a counselor who was now co-located in the office suite four days per week, but lamented, "even with that, with having them here, [if] a parent still doesn't think they need that, they will no-show." She continued: "Is someone really ready to start working on this issue and do they have time to come back to the doctor's office?" she asked. "A lot of it is trust. Just having slots open does not mean they will be seen." With regard to why past QI experience might be negatively associated with confidence-building, a physician from an "average" uptake practice remarked that this may relate to BMW being what he perceived as an "unusual" QI project. "Most of the data we're used to taking is hard, or factual, like BMI," he said. "Maybe practices with experiences with QI have experiences with different types of QI. It's not just 'did you prescribe this medication, yes or no,' it was 'did you provide a screening, did you talk about behavior'…a whole process that I guarantee no one has done in medical school." We conclude from unexpected findings that having structures/processes and technologies in place is not sufficient to support an innovation like mental health promotion, which is highly dependent upon more human elements of care, such as culture/climate, trust, communication skills, and the quality of interpersonal relationships. These findings are corroborated by Harkness & Bower (2009), who found that co-location failed to decrease demands on clinicians and that service outcomes were variable, suggesting it "operates by altering inter-professional as well as inter-personal working relationships" (p. 10) in ways that have been inadequately addressed to date. They also suggest that coordinating structures (e.g. case conference mechanisms), coordinating roles (e.g. an assigned care coordinator), and co-location – which Pfefferle et al. (2006) propose are each individually related to the service outcome of coordination of mental health care in pediatrics – may also interrelate with each other and with other aspects of organizational context.

Taken together, these findings point to the benefit of putting "care in context" by taking

steps to enhance organizational context in preparation for or in parallel with mental health service implementation. Practices overall demonstrated change in inner context as measured by the Office Inventory, with the lowest-scoring practices achieving the greatest magnitude of change; the good news is that even environments perceived as unsupportive to mental health may be amenable to change over the course of a Learning Collaborative. Factors that facilitated or hindered this process included rural location (🡻 context change), ACO accreditation (🡹 context change), and co-located mental health specialist (🡹 context change). Practices located in rural areas, in addition to reporting less change in context over time, had more negative perceptions of context from the start. These relationships are in the hypothesized direction and corroborated by staff participating in qualitative interviews, who identified reimbursement structures as the greatest barrier to mental health service implementation. ACOs support payment models that are more likely to reward outcomes over service volume or type, incentivizing a shift in resources toward mental health services. Rural practices may have had difficulty forging links with mental health providers and found it financially unfeasible to task-shift, whereas those with co-located specialists might have had a technical advantage in each of these areas (Meadows et al., 2011).

The structure of our client outcome variable, small sample size of practices that reported client outcomes, and lack of practice-level service outcomes data, as described in a previous study (King, 2016b), precluded us from testing whether implementation outcomes mediated service and client outcomes. Another relationship not studied, given the explicit focus on implementation, was the extent to which organizational context affects a practice's decision to join BMW and the ability to maintain improvements over time. Both the potential mediating role of organizational context, as illustrated in our conceptual model, and its contribution to adoption and sustainability, should be subjects of future research. In the meantime, the finding that organizational context is a moderator of implementation outcomes is significant; when an effective intervention is not implemented fully, service and client outcomes are unlikely to follow.

We conclude that pediatric primary care practices could benefit from identifying elements of "outer/fixed context" that may serve as strengths or present bottlenecks to mental health promotion and consider these as they develop aims and implementation strategies. For example, if a rural practice knew that facilitating referrals would be a challenge, but essential to their larger organizational goal of achieving PCMH status, they might consider strategies such as delivering brief interventions in-house, experimenting with telemedicine, having a mental health specialist on-staff one day per week, obtaining transportation vouchers for families in need, engaging family partners or volunteers to help families navigate the system, and/or or creating a resource directory and database for follow-up. While elements of "outer context" are less amenable to change in the short-term, and will require policy and regulatory change on behalf of states and insurers to address, there are also strategies that pediatric primary care providers can take to directly address their "inner context." Overlaying the results of this study with themes that arose in in-depth interviews (King, 2016c) and in discussions of the qualitative interview and Boolean results among the core BMW implementation team, we offer 10 practical suggestions:

1. **Start with small cycles of change**. Celebrate small wins and create open space for staff to learn from one another and to share success stories. Most change is incremental and continuous (IHI, 2003). Tackling "low-hanging fruit" – for example by instituting a two-question screening tool – can be a way to build confidence, and the potential ripple effect cannot be underestimated: So-called technological changes typically bring about parallel changes in social processes, such as office roles and communication (Burke, 2014). As Elmer & Kilpatrick (2008, p.35) suggest, the value of a Learning Collaborative is not just in the potential to improve a single metric, such as patient safety, but in the opportunity to make more fundamental changes to organizations. "Engaging with a quality improvement program can change the nature of social interactions within the organization," they write. "In this way, quality improvement programs can impact on organisational culture."

2. **Take inventory of the structures/processes and technologies in place to support mental health care – but don't be overly reliant on them**. Having an electronic medical record in place is particularly helpful when it comes to screening, outcomes monitoring, and follow-up. Data can be collected and reviewed more efficiently, making it easier to gauge progress toward goals. Likewise, considering a co-located mental health specialist may be beneficial, particularly for those working in underserved communities. In either case, mental health care will still require different ways of engaging and communicating and the "unsticking" of old structures and processes to make way for the new. As the case of BMW exemplifies, practices couldn't rely upon past experience with QI if it perpetuated old ways of working together, nor could they rely upon co-location if they hadn't gotten to know the providers. In a recent study, Wissow et al. (2016) found that people in practices with co-location found mental health care to require more work. Insofar as new ways of working and communicating lead to smooth referrals over time, these growing pains are hopefully short-lived.

3. **Gauge your practice's culture and climate.** Cultural assessment is like a personality test; there are many different types of cultures and no one culture is necessarily "better" than another. That said, some cultural values have been linked to particular tasks; more group-oriented and developmental cultures, for example, have been shown to be better at organization change (Shortell et al., 1995). As Gaucher and Coffey (1993) write, a good place to begin might be asking: *Have you completed a cultural assessment? Do you have a values statement? Are the values communicated, understood, and upheld? Who are your heroes? How do you celebrate? Do positive or negative stories get reported?* If you haven't assessed your culture, consider doing so through walkarounds, interviews, or surveys (Hills, 2011). Some surveys, such as the Office Inventory (King, 2016b), are specific to the culture for mental health implementation in primary care, whereas others, such as the CVF (Kimberly & Quinn, 1984), take stock of more general cultural values. A number of surveys are available

free of charge through organizations such as SAMHSA-HRSA (2016) and could be used "as is" or modified to meet your practice's needs. As a general rule of thumb, look for surveys that are theory-based and reliable/valid measures of what you seek to achieve.

4. **Encourage all-staff participation in mental health service implementation.** This criterion was the single necessary predictor of BMW program uptake, according to qualitative interviews. In interviews, participants said that if their co-workers were not on the same page from check-in to follow-up, momentum and continuity were lost and the process of mental health care became less efficient and more time-consuming for all. Cross-role participation is harder to achieve in organizations with predominantly hierarchical or rational values, highlighting the value of knowing your culture type. In a culture of mental health, people treat mental health as a primary goal of their work and responsibility for mental health care is shared across all roles and levels. Staff have an interest in the topic and how it can help their patients. An activity to "build the case" prior to project start might be a good idea for those practices where buy-in, participation, or interest is limited. Change won't happen if the foundation for a culture of mental health isn't there or if one person plans to do all the work.

5. **Don't look to the usual suspects**. Empower people who are passionate about mental health and who might not typically have an opportunity to play a leadership role. Staff participating in qualitative interviews spoke of lived experience as a consumer or parent/caregiver as supporting them in connecting with patients and engaging community networks to help patients navigate services. Moreover, they felt a sense of mission in helping families like their own. Consumers have always played a vital role as advocates and implementers of community mental health services (Frese & Walker Davis, 1997; Gehart, 2012a, 2012b). Also, more generally, non-managerial and non-physician staff said the opportunity to be an agent for change made them feel valued and like their work more.

6. **Ensure the change effort has the support of senior leadership and that there is a project champion to see activities through.** Change is difficult and necessarily involves growing pains. For that reason, leaders must believe in and support a culture of mental health, communicate these values, relate them back to the things staff care about, and support and reward new mental health care practices. When employee incentives don't match espoused values, the real values are communicated. As Campbell (2009, p. 341) wrote in *Creating a Winning Organizational Culture*, good leaders find ways to ensure values resonate with staff, linking "the values, norms, and philosophies of the organizational culture to those of the individual, to enact organizational change." Champions, too, are needed to motivate participation and build consensus – particularly when attitudes toward a new practice are mixed. While the saying goes that one bad apple can spoil the bunch, this study demonstrates that a positive organizational climate can lift the attitudes of everyone on the team.

7. **Stage exercises to redefine roles and workflows**. Give the people who do the work, such as front desk staff and medical assistants, the autonomy to try new things. Over a century of research on organizational behavior shows that the front-line staff typically have a good sense of what isn't working and what changes will lead to greater efficiency (Burke, 2014). This is especially important in work climates where staff feel unsure of or conflicted in their roles. Ensure new processes have the buy-in and support of managers and leaders before rolling them out, so as to not reinforce this conflict.

8. **Take steps to build a therapeutic social environment**. The act of introducing mental health care into a setting where there are many competing time demands and priorities can make for a stressful climate for those working on the front lines to "bridge the gap" for their patients. Interview narratives suggested a need to build a more therapeutic environment for staff. Notable examples of holistic approaches to transforming the cultures of clinics and hospitals

to be more supportive of staff and client mental health alike are Sandra Bloom's Sanctuary Model (www.sanctuaryweb.com) and Angelica Thieriot's Planetree (www.planetree.org). As Lasserre (2010) writes with regard to cultures of service excellence, "the manner in which physicians and leaders treat and serve their peers, colleagues, and employees serves as a model for how the team treats patients and their families/caregivers." Since the climate that families sense when they walk into a waiting room sets the tone for the rest of the visit, the act of being cared for by a healthy provider may, in and of itself, facilitate recovery.

9. **People need bread and roses, too**. In his seminal work on hospital building design, Ulrich (1984) found that patients whose rooms had natural light and views of nature had better outcomes. Now thirty years later, there is a plethora of evidence to suggest that primary care practices may wish to consider how elements of evidence-based building design can not only promote patient-staff interaction (Brooks & Griffin, 2010), but also foster more therapeutic environments (Callahan, Repeta Jr., & Sherman, 2014). Ulrich's (1991) theory of supportive design, for example, describes ways in which health care facilities might be designed to help patients, visitors and staff cope with stress, and initiatives exist to bring providers together with architects and other built environment experts to integrate design principles into health care projects (www.healthdesign.org/research-services/pebble-project). In what ways could your building be enhanced to support mental health? As a start, consider for example the steps one medical center took to support a culture of healing: creation of a healing garden, introduction of massage therapy and therapy dogs, painting of murals in waiting rooms, renovation of staff lounges, and a staff wellness program (Geary, 2003). As BMW participants said in interviews, having colorful materials in waiting rooms and copies of screeners and patient education materials in hallways and exam rooms was not only visually pleasing, but also served as useful reminders of mental health to patients and staff alike.

10. **Mind the bigger picture.** Develop an implementation plan that positions mental health services among larger institutional goals and strategies. Replace – don't add – work and look for efficiencies. Narratives suggest that practices would be well advised to consider the timing of their participation in a Learning Collaborative to coincide with other more global transformation efforts, such as attaining PCMH or ACO status. Without a plan for what specific strategies to work on, and buy-in across the organization, progress in BMW slowed. Likewise, in cases where significant barriers were present, but openly acknowledged and addressed, staff often came up with creative solutions.

Table 5.3: Simple linear regression of change in attitudes (PBS total score) on context variables

	Crude Model (n=17)	
	β (95% CI)*	*P* Value
Multivariable Model Intercept		
Weekly Patient Volume**	-0.006 (-0.0198, 0.00664)	0.299
Health System Affiliation		
Not affiliated[R]	Reference	Reference
Affiliated	-1.80 (-7.80, 4.41)	0.546
Co-Located MH Specialist		
No MH Specialist On-Site[R]	Reference	Reference
MH Specialist On-Site	-2.63 (-8.18, 2.92)	0.328
Location		
Urban[R]	Reference	Reference
Suburban	-2.31 (-8.97, 4.36)	0.596
Rural	-2.60 (-10.3, 5.14)	0.483
ACO Status at Baseline		
Not Participating in ACO[R]	Reference	Reference
Participating in ACO	-6.16 (-14.4, 2.04)	0.130
PCMH Status at Baseline		
Not NCQA-Certified PCMH	Reference	Reference
NCQA-Certified PCMH	0.522 (-11.6, 12.7)	0.928
% of Patients Publicly-Insured		
Low (<30%)	Reference	Reference
High (≥30%)	**7.95 (3.45, 12.4)**	**0.002**
Past Participation in QI Projects		

No Past Participation in QI	Reference	Reference
Past Participation in QI	5.14 (-0.473, 10.7)	0.070
Electronic Medical Record		
No EMR	Reference	Reference
EMR	2.60 (-6.16, 11.4)	0.536
Baseline Culture	0.200 (-0.0543, 0.455)	0.114
Baseline Structure/Processes	**0.291 (0.0284, 0.553)**	**0.032**
Baseline Climate	0.386 (-0.0606, 0.834)	0.085
Average IRA	10.0 (-3.14, 23.1)	0.126
Average % Group/Developmental	0.0431 (-0.325, 0.412)	0.806
Baseline Technology	0.101 (-0.0551, 0.258)	0.188
Baseline Total Context Score	**0.433 (0.00778, 0.858)**	**0.046**

Abbreviations: CI, confidence interval; R, reference or intercept

* β values represent difference between comparison and reference group

** Weekly patient volume was not reported for the SBHC clusters, so for this variable the "n" is 14 practices

Table 5.4: Simple and multivariable linear regression of uptake (continuous star score) on context variables

	Crude Model (n=15)		Multivariable-Adjusted Model (n=15)	
	β (95% CI)*	*P* Value	β (95% CI)*	*P* Value
Multivariable Model Intercept			47.5 (26.2, 68.8)	0.003
Weekly Patient Volume	-0.007 (-.0182, .00337)	0.162	0.008 (-0.0161, 0.0326)	0.400
Health System Affiliation				
Not affiliated[R]	Reference	Reference	Reference	Reference
Affiliated	-1.83 (-8.21, 4.54)	0.545	-3.22 (-8.43, 1.99)	0.162
Co-Located MH Specialist				
No MH Specialist On-Site[R]	Reference	Reference	Reference	
MH Specialist On-Site	-3.25 (-9.25, 2.75)	0.263	-6.20 (-19.6, 7.19)	0.268
Location				
Urban[R]	Reference	Reference	Reference	Reference
Suburban	-1.75 (-8.75, 5.25)	0.596	-9.32 (-22.6, 3.93)	0.117
Rural	-4.50 (-12.3, 3.29)	0.232	-9.27 (-21.6, 3.11)	0.106
ACO Status at Baseline**				
Not Participating in ACO[R]	Reference	Reference	--	--
Participating in ACO	0.308 (-8.58, 9.20)	0.942	--	--
PCMH Status at Baseline				
Not NCQA-Certified PCMH	Reference	Reference	Reference	Reference
NCQA-Certified PCMH	**4.92 (1.10, 8.74)**	**0.015**	4.46 (-2.92, 11.8)	0.169
% of Patients Publicly-Insured				
Low (<30%)	Reference	Reference	Reference	Reference
High (≥30%)	-0.100 (-6.89, 6.69)	0.975	**-7.35 (-13.6, -1.14)**	**0.030**
Past Participation in QI Projects				

No Past Participation in QI	Reference	Reference	Reference	Reference
Past Participation in QI	0.944 (-5.34, 7.23)	0.751	1.54 (-6.79, 9.87)	0.635
Electronic Medical Record**				
No EMR	Reference	Reference	--	--
EMR	**7.77 (3.24, 12.3)**	**0.003**	--	--
Baseline Culture	**0.294 (0.0874, 0.502)**	**0.009**	--	--
Baseline Structure/Processes	**0.269 (0.0311, 0.508)**	**0.030**	--	--
Baseline Climate	0.382 (-.066, 0.831)	0.088	--	--
Average IRA	0.0329 (-0.103, 0.169)	0.611	-0.0727 (-0.211, 0.0660)	0.219
Average % Group/Developmental**	**0.200 (0.0371, 0.363)**	**0.020**	--	--
Baseline Technology	**0.130 (.00192, 0.258)**	**0.047**	--	--
Baseline Total Context Score	**0.536 (0.112, 0.960)**	**0.017**	**0.649 (0.179, 1.12)**	**0.019**

Abbreviations: CI, confidence interval; R, reference or intercept

* β values represent difference between comparison and reference group

** ACO status, use of EMR to monitor patient progress, and average % group/developmental were dropped from the adjusted model due to collinearity and assessed through crude models.

Table 5.5: Simple and multivariable linear regression analyses of change in total clinician confidence score on context variables

	Crude Model (n=44 or 48)		Multivariable-Adjusted Model (n=44 or 48)	
	β (95% CI)*	*P* Value	β (95% CI)*	*P* Value
Model 1: Influential Observations Dropped (n=44)				
Multivariable Model Intercept			0.726 (0.0783, 1.37)	0.028
Weekly Patient Volume	-0.000442 (-0.000801, -0.0000835)	0.016	-0.000639 (-0.000899, -0.000380)	0.000
Health System Affiliation				
Not affiliated[R]	Reference	Reference	Reference	Reference
Affiliated	-0.191 (-0.580, 0.197)	0.334	0.0636 (-0.0779, 0.205)	0.378
Co-Located MH Specialist				
No MH Specialist On-Site[R]	Reference	Reference	Reference	
MH Specialist On-Site	-0.0419 (-0.370, 0.286)	0.802	**0.300 (0.0996, 0.501)**	**0.003**
Location				
Urban[R]	Reference	Reference	Reference	Reference
Suburban	-0.155 (-0.574, 0.264)	0.469	-0.0342 (-0.226, 0.158)	0.727
Rural	0.0139 (-0.460, 0.488)	0.954	**-0.696 (-1.04, -0.352)**	**0.000**
ACO Status at Baseline**				
Not Participating in ACO[R]	Reference	Reference	Reference	Reference
Participating in ACO	-0.0741 (-0.526, 0.377)	0.748	--	--
PCMH Status at Baseline				
Not NCQA-Certified PCMH	Reference	Reference	Reference	Reference
NCQA-Certified PCMH	**0.537 (0.369, 0.706)**	**0.000**	**1.54 (1.10, 1.99)**	**0.000**
% of Patients Publicly-Insured				
Low (<30%)	Reference	Reference	Reference	Reference
High (≥30%)	-0.00724 (-0.356, 0.341)	0.968	0.110 (-0.0112, 0.231)	0.075

Past Participation in QI Projects				
No Past Participation in QI	Reference	Reference	Reference	Reference
Past Participation in QI	-0.222(-0.582, 0.137)	0.225	**-0.804 (-1.08, -0.522)**	**0.000**
Electronic medical record**				
No EMR	Reference	Reference	Reference	Reference
EMR	0.119 (-0.212, 0.451)	0.480	--	--
Baseline Culture	0.00916 (-0.00194, 0.0203)	0.106	--	--
Baseline Structure/Processes	**0.0133 (0.00379, 0.0229)**	**0.006**	--	--
Baseline Climate	0.0220 (-0.00151, 0.0455)	0.067	--	--
Average IRA	0.00221 (-0.00427, 0.00869)	0.504	**0.0079 (.0032, 0.0127)**	**0.001**
Average % Group/Developmental**	0.00589 (-0.0124, 0.0244)	0.524	--	--
Baseline Technology	0.00643 (-0.00117, 0.0140)	0.098	--	--
Baseline Total Context Score	**0.0218 (0.00225, 0.0412)**	**0.029**	-0.0000153 (-0.0189, 0.0188)	0.999
Model 2: Influential Observations Included (n=48)				
Multivariable Model Intercept			0.997 (-0.518, 2.51)	0.197
Weekly Patient Volume	-0.000526 (-0.000977, -0.0000751)	0.022	-0.000443 (-0.00103, 0.000141)	0.137
Health System Affiliation				
Not affiliated[R]	Reference	Reference	Reference	Reference
Affiliated	-0.165 (-0.517, 0.187)	0.358	0.0757 (-0.300, 0.451)	0.693
Co-Located MH Specialist				
No MH Specialist On-Site[R]	Reference	Reference	Reference	Reference
MH Specialist On-Site	-0.124 (-0.470, 0.222)	0.483	0.0605 (-0.297, 0.418)	0.740
Location				
Urban[R]	Reference	Reference	Reference	Reference
Suburban	-0.0729 (-0.508, 0.362)	0.743	-0.124 (-0.511, 0.263)	0.530
Rural	-0.0434 (-0.501, 0.414)	0.852	**-0.782 (-1.54, -0.0279)**	**0.042**
ACO Status at Baseline				

Not Participating in ACO[R]	Reference	Reference	Reference	Reference
Participating in ACO	0.197 (-0.589, 0.983)	0.624	--	--
PCMH Status at Baseline				
Not NCQA-Certified PCMH	Reference	Reference	Reference	Reference
NCQA-Certified PCMH	0.514 (0.343, 0.686)	0.000	**1.38 (0.419, 2.33)**	**0.005**
% of Patients Publicly-Insured				
Low (<30%)	Reference	Reference	Reference	Reference
High (≥30%)	-0.0509 (-0.414, 0.313)	0.784	0.0492 (-0.228, 0.327)	0.728
Past Participation in QI Projects				
No Past Participation in QI	Reference	Reference	Reference	Reference
Past Participation in QI	-0.179 (-0.544, 0.186)	0.335	-0.692 (-1.34, -0.0447)	0.036
Electronic Medical Record**				
No EMR	Reference	Reference	Reference	Reference
EMR	0.140 (-0.191, 0.472)	0.407	--	--
Baseline Culture	0.00951 (-0.00262, 0.0216)	0.125	--	--
Baseline Structure/Processes	**0.0121 (0.00351, 0.0207)**	**0.006**	--	--
Baseline Climate	0.00924 (-0.0161, 0.0346)	0.475	--	--
Average IRA	-0.000833 (-0.0101, 0.0084)	0.860	0.00328 (-0.00694, 0.0135)	0.530
Average % Group/Developmental**	0.0133 (-0.00861, 0.0352)	0.235	--	
Baseline Technology	0.00630 (-0.000646, 0.0132)	0.075	--	--
Baseline Total Context Score	0.0179 (-0.00155, 0.0373)	0.071	0.00292 (-0.0342, 0.0401)	0.878

Abbreviations: CI, confidence interval; R, reference or intercept

* β values represent difference between comparison and reference group

** ACO status, use of EMR to monitor patient progress, and average % group/developmental were dropped from the adjusted model due to collinearity and assessed through crude models.

CHAPTER SIX: DISCUSSION

"When people say 'rehearsal,' they're usually talking about only actors. But there's a rehearsal that goes on with all the people of the crew, in every department. The idea is to get everybody to come together and go down the same track – the track indicated by the ideas."

– David Lynch, filmmaker, in *Catching the Big Fish*

Summary of Findings

Research Aim 1 – Concept Explication: Describe rationale for development of an instrument to measure organizational context as it relates to mental health service implementation in pediatric primary care and test psychometric properties of an initial survey tool.

A chronology of lessons learned about bringing evidence-based treatments in child mental health into everyday practice demonstrated that means of assessing and intervening with organizational context are needed to effectively implement mental health services in pediatric primary care. Organizational context refers to attributes of both the internal ("inner context") and external ("outer context") environments and inter-organizational networks in which health care providers operate. A review of the empirical health services literature revealed that inner organizational context is commonly defined in terms of both the social *culture* and *climate* and the colder *structures/processes* and *technologies* that exist within a practice. How we define and operationalize each domain is driven by the perspective that we take – in our case that there exists a context that is more or less conducive to mental health implementation and that is amenable to evolutionary change. This includes a more group/developmental culture that values mental health; a climate in which characteristics of role, job, leader behavior, workgroup and organization are supportive of mental health care implementation; and structures/processes and technologies that provide the framework and resources around which to organize more human aspects of health care delivery. While many general tools for assessing these domains of organizational context exist, we identified just one tool that explicitly measured readiness for mental health service implementation in pediatric primary care. Since this tool focused predominantly on structures/processes and technologies, we drew upon the literature to modify this tool to create a Pediatric Primary Care Office Inventory ("Office Inventory") that measures both clinician attitudes toward mental health services and the organizational culture and climate for mental health service implementation. A final version of the Office Inventory is in development based

upon findings of this dissertation, as described in detail under *Research Implications*. In the meantime, assessments of content validity, face validity, dimensionality/internal structure, construct validity, internal consistency, inter-rater agreement, and between-practice differences suggest the initial version is an adequately reliable and valid measure of a pediatric primary care practice's context for mental health service implementation.

Research Aim 1 – Mechanisms of Change: Explore and test what aspects of organizational context are associated with pediatric primary care practice change and the ways in which context acts as a facilitator or barrier to change in pediatric primary care practices in Ohio.

> **Objective 1:** Explore, using in-depth semi-structured qualitative interviews, how pediatric primary care staff conceptualize organizational context as a facilitator of and/or barrier to change (including what aspects of organizational context changes during the initiative and how these changes supported implementation of mental health services).

Organizational context, such as cultures that facilitate reengineering of team workflows and climates that favor autonomy, arose as critical to intervention uptake and the application of new mental health care knowledge and skills. Individual-level attributes such as attitudes toward mental health and macro-level factors such as health care finance were also described as important to uptake, and upon deeper analysis, seemed to determine the types of practices that would be successful from the start: Where strong disincentives to integrate existed, practices where staff drew upon *lived experience*; had *effective champions and sponsoring leaders*; and *positioned BMW among more global practice aims* were more apt to "bridge the gap" where others lagged or dropped out. Cultural change was evident from descriptions of shifts in shared staff expectations to treat *mental health as part of whole health* and client attitudes toward mental health. Other changes that supported implementation of mental health services included *formalizing roles and reconfiguring workflows*; encouraging *all-staff participation* and engaging and supporting non-clinical and non-managerial staff in roles as change agents; *introducing screening and assessment tools;* and enhancing the *built environment*. These shifts were described as bringing about positive changes, such as greater awareness of and attention to mental health concerns; compassion and understanding toward families; shared language; client and staff

safety; and improvements in client health and clinic efficiency. Negative changes were also reported, including feelings of role conflict when incentives did not align with cultural values, and feelings of depression and futility when caring for families facing violence and trauma.

External and internal policies and incentives did not always align with changes in cultural values, as evidenced by climate descriptions of *time constraints and role conflict* and the call for *therapeutic social environments* to support the wellbeing of staff engaged in emotionally challenging work. Indeed, while narratives strongly suggest that BMW supported mental health care implementation through organizational context change, market forces were described as a formidable challenge to success, particularly among providers serving impoverished and rural communities. This was evident from pervasive descriptions of a climate of time constraints and role conflict across "leading" and "lagging" practices alike. If staff are not given the tools to meet organizational expectations, then as Gershon, Stone, Bakken, & Larson (2004, p. 38) so aptly state, "regardless of the cultural message espoused, the 'real' message will be communicated." Interviewees emphasized that having structures in place is important, but not enough to be successful when integrating mental health care into contexts of time and financial constraints. Practices that progressed despite these barriers tended to have highly group-oriented cultures from the start and/or diversified their strategies to foster a culture and climate more receptive to mental health. Findings suggest that in the absence of policy change, Learning Collaboratives will face the formidable challenge of helping primary care teams to address toxic stress and mitigate role conflict. More fundamental policy and regulatory changes on behalf of states and insurers are needed to support new models of care and reimbursement that reward organizations working to address physical and psychosocial concerns together to achieve optimal health outcomes.

Research Aim 1 – Mechanisms of Change: Explore and test what aspects of organizational context are associated with pediatric primary care practice change and the ways in which context acts as a facilitator or barrier to change in pediatric primary care practices in Ohio.

> **Objective 2:** Test, through analysis of survey data, whether aspects of outer/fixed organizational context (payer mix, health system affiliation, medical home and accountable care organization status, number of staff, urban/suburban/rural, weekly

patient volume, co-located specialists, prior QI experience, outcomes tracking systems) and baseline inner organizational context moderate implementation outcomes.

Objective 3: Use qualitative comparative analysis to illuminate combinations of outer/fixed context characteristics (payer mix, health system affiliation, medical home and accountable care organization status, number of staff, urban/suburban/rural, weekly patient volume, co-located specialists, prior QI experience, outcomes tracking systems) that are necessary or sufficient for BMW participants to be "leading" in implementation.

Taken together, findings support the hypothesis that inner context is a moderator of implementation outcomes. *Culture*, *structures/systems*, *climate*, and *technology*, as measured by the preliminary revised version of the Office Inventory, were shown to enhance providers' ability to take on new tasks in pediatric primary care. Details for each outcome follow:

Attitudes. We took the perspective espoused by James & James (1989) that organizational context is a social construct that arises from the cognitive appraisals of individual staff. When staff are in agreement, then these perceptions may be aggregated to the practice level, and the environment studied as an organizational construct. Indeed, organizational climate was found to exert a "contextual" effects on attitudes above and beyond the effects of the psychological climate perceptions of individual staff. Even for seemingly black-and-white, observable aspects of the environment, staff in different roles reported different experiences and perceptions, demonstrating the importance of operationalizing context domains as scales versus indices. In addition, practices with high percent of publicly-insured experienced a far smaller change in clinician attitudes over time than practices with fewer publicly-insured children/youth in their payer mix.

Uptake. PCMH status and use of EMR to monitor patient outcomes had a positive association with uptake in statistical models, whereas high percent publicly-insured had a negative association. Boolean analysis corroborated and provided greater depth to statistical findings. In csQCA, absence of EMR was found to be a sufficient criteria for "lagging" uptake status in our sample. The csQCA also showed it was the *combination* of a practice's payer mix and existence of a co-located mental health specialist and the *combination* of health system affiliation and within-practice resource availability that led to "leading" vs. "lagging" uptake.

Our finding that practices attained "leading" status when they had both high percent of publicly-insured and a co-located mental health specialist was corroborated by BMW participants, who said that practices working in underserved communities with high acuity of need benefited from the ability to refer youth/families to mental health specialists to provide more comprehensive mental health care. That co-location led to "lagging" status in practices with low/average percent of publicly-insured also resonated with participants, who said that having structures/processes and technologies in place is not sufficient to support an innovation like mental health promotion, which is highly dependent upon more human elements of care, such as culture/climate, trust, communication skills, and the quality of interpersonal relationships.

Confidence. At last, PCMH status and co-location were positively associated with changes in confidence with common factors and common elements skills, whereas rural location and past QI experience were negatively associated.

Overlaying results from those of our second aim, we found that those who progressed despite an unsupportive outer/fixed context tended to consider strengths and barriers as they developed their aims and diversified their strategies to make multiple aspects of context more supportive of mental health. For example, where financial disincentives to integrate existed, practices where staff drew upon lived experience; had effective champions and sponsoring leaders; and positioned BMW among more global practice aims were more apt to "bridge the gap" where others lagged or dropped out. Ten practical recommendations were made for taking steps to enhance inner context in preparation for or in tandem with a Learning Collaborative.

Aim 3: Intervention Effects: Test, through analysis of survey and Medicaid claims data, whether the complex Ohio BMW Wave III Learning Collaborative intervention supported mental health service implementation among participating pediatric primary care practices.

Twenty-six practices completed Ohio BMW Wave III (three of the original 29 enrollees dropped out). Each of these 26 practices engaged in Breakthrough Series and four on-site academic detailing sessions and implemented all program activities in an average of three of the

following areas: resource tracking, mental health promotion and screening, integrated planning and implementation, and practice-based interventions. Uptake of online modules was comparatively low. Greatest advancement was seen in mental health promotion and screening and integration planning and implementation, inclusive of advancing one or more levels on the models of integrated care, and least advancement was seen on practice-based interventions, due to relatively low participation in online learning components.

Implementation Outcomes. Inner context change, as measured by the preliminary revised version of the Office Inventory, was demonstrated in each domain (*culture*, *systems/structure*, *climate*, and *technology*). For the climate domain, which measures surface-level expressions of what it's like working in a practice, only items relating to role conflict, role ambiguity, and job importance changed. This may indicate that this is where the intervention had the most measurable impact; the atmosphere produced by cultures and structures/processes can take longer to change; or misalignment between cultures (e.g. mental health as a primary goal shared by all staff) and practices (e.g. incentive systems that align with this goal). Taken together, changes in culture and climate provided evidence of an enhancement of the social environment to be more supportive of mental health. Changes in the systems/structures and technologies domain and achievement of BMW Star Recognition in turn provided evidence of change to more system-related elements that map to the CCM, including community linkages, delivery system design, child and family support, clinical information systems, and decision support. An unanticipated but potentially key outcome of the intervention was its demonstrated success in improving staff consensus on these context domains. Changes in climate coincided with similarly robust changes in clinician attitudes, as evident from a decrease in total PBS scores of 11% (95% CI: -20%, 1.0%). While changes in the burden subscale, which measures impact on workload, demands, and time, were significant (95% CI: -26%, -1.1%), changes in the beliefs/feelings subscale were not (95% CI: -19%, +2.8%). These counterintuitive results suggested potential merit in revalidating the PBS as a measure of psychosocial orientation in primary care. At last, clinician self-ratings of

confidence using "common factors" strategies for building therapeutic relationships and "practice elements" for low mood increased on average 20% (95% CI: 15, 25%).

Service outcomes. Practices demonstrated greater rates of screening, diagnosis, and treatment over time, as evidenced by a larger proportion of encounters billed with mental health diagnosis codes. Overall rates of mental health diagnosis increased 1.92 percentage points (95% CI: 1.59, 2.26, p=0.000) from 8.30% in the six months "pre" to 10.2% in the six months "post" and significant increases were seen in the proportion of child/youth visits billed with disruptive behavior (p=0.001), ADHD (p=0.000), or depression/anxiety (p=0.000) diagnosis codes. Notably, the proportion of youth with mental health diagnoses came close to the lower bound of national prevalence estimates (13 to 20%) following completion of the intervention. Rates of typical antipsychotic prescribing by BMW clinicians decreased 37% (p=0.0379) and stimulant prescribing by BMW clinicians increased 9% (p=0.0078). Rates of prescribing of potentially contraindicated medications for bipolar disorder and disruptive behavior stayed the same.

Client outcomes. The success of pediatric primary care staff in applying new skills learned over the course of the Learning Collaborative, and enhancing organizational contexts to be more supportive to mental health, was ultimately evidenced by a comparison of mental health symptoms improvement among two cohorts of children/youth seen by providers at baseline (Cohort 1) and following completion of the four on-site academic detailing sessions (Cohort 2). Strengths and difficulties questionnaire (SDQ) symptoms scores improved an additional 0.981 points (95% CI: -1.90, -0.060) from 0 to 3 months and 1.30 points (95% CI: -2.75, 0.160) from 0 to 6 months for Cohort 2 as compared to Cohort 1. This represents small but significant improvement in child/mental health outcomes over the course of the intervention.

Limitations and Strengths

There are several limitations and strengths to this research, most stemming from the push and pull between implementing a Learning Collaborative intervention that creates an optimal

experience for pediatric primary care providers *and* that supported our research aims. The quasi-experimental design was largely driven by the pragmatic constraints of BMW Wave III being first and foremost a quality improvement project. No practice was "denied" any intervention component or asked to report outcomes data for research purposes only, and administrative requirements were kept to a minimum. As a result, we were unable to use identifiers to link staff responses across surveys and time points, affecting choice of statistical methods to test intervention and moderation effects. While not necessarily a limitation, it is important to keep in mind the explicit focus on *implementation* among practices that are already adopters. Organizational characteristics associated with *adoption* or *sustainment* of an intervention to implement mental health services may be very different from those associated with successful implementation. Likewise, while our explicit focus is the organization, it important to recognize that in any intervention, factors at multiple ecosocial levels should be considered as pertinent to success at each stage. We use **bolding** to highlight how elements of inner and outer organizational context defined in our research are situated within the model of implementation developed by Aarons et al. (2011). The model, which uses the terms inner and outer context in a much broader sense to refer to the multiple ecosocial levels within (inner) and outside (outer) an organization, has four stages: (1) exploration, (2) adoption, (3) **implementation**, and (4) sustainment. Outer context factors relevant at each stage include: **sociopolitical/funding** (1,2,3,4); client advocacy (1,2); **inter-organizational networks** (1,2,3); intervention developers (3); **leadership** (3); policy (4); and public-academic collaboration (4). Inner context factors include: **organizational characteristics** (1,2,3,4); leadership (2); individual adopter characteristics (1,3); innovation-values fit (3); fidelity monitoring and support (4); and staffing (4). To summarize, this research focused on **organizational** determinants of primary care and mental health integration at the **implementation** stage. Our aim was not to develop another general model of EBP implementation, given that many excellent models exist. Our aim was rather to explore in-depth the role of organizational context, an essential component of many

general models such as Aarons' aforementioned "global factors" and Damschroder et al.'s (2009) "consolidated framework" that is not often discussed in detail. There has been a call to action for greater use of social and behavioral theory in the implementation and evaluation of practice change interventions (Grol, Bosch, Hulscher, Eccles, & Wensing, 2007). To this end, the case of BMW served as an opportunity to apply theories that are by no means new, but that lend critical perspective to the task of integration at a time when new programs are proliferating.

Limitations

The **quasi-experimental single-group pretest-postest design** is our greatest limitation. Such a design brings with it threats to internal validity, with the primary concerns in our case being insufficient control of confounders and concurrent historical events (Harris et al., 2006). It also allows for the possibility of a Hawthorne effect, whereby subjects become aware of the intent of the study after taking the baseline surveys, and this knowledge effects how they score items on the post surveys. This could cause changes in organizational context as measured by the Office Inventory to be overstated. However, because the baseline Office Inventory was only shared with practice leads, and findings were not discussed with all staff until after post data were collected, the likelihood of such an effect is low in this case. Were BMW a research project, we might have chosen a cluster-randomized effectiveness trial design, where sites are randomized to waves and "intervention" sites participating in early waves are compared to "control" sites participating in later waves, or a non-equivalent control group design, where "intervention" sites are matched to "control" sites with similar organizational contexts.

A second limitation is potential **non-equivalencies of staff and clients from baseline to post-intervention**, driven by turnover and seasonality of mental health care-seeking, respectively. With the exception of clinician confidence measures, staff were not followed longitudinally and baseline and post samples were treated as independent. Thus, this was of little concern at the staff level, especially since we expected staff responses to survey items to reflect

their current experience of the practice environment, regardless of whether they participated in the program. Seasonality could be an issue in cases where a practice has one measure conducted in fall or spring and the comparison in summer or winter. This is because fall and spring tend to coincide with more intensive care-seeking. Given that (a) we controlled for responsiveness to treatment and acuity of current impact in models of client outcomes, and (b) pre and post periods for service outcomes each began and ended in the same seasons, this was not a concern.

A third limitation is that this **study focused explicitly on implementation, as opposed to adoption or sustainability**. Factors that relate to adoption or sustainability are likely to differ, and thus the elements of organizational context identified as important are particular in this case to early adopters in the implementation stage. Finally, the **small number of practices in our sample (n=29)** poses potential issues with external validity (is the sample representative of the larger popoulation) and internal validity (do our assumptions hold). As discussed in Manuscript 4, modest sample size in some cases limited our power to test the moderating effects of organizational context on implementation outcomes. It also precluded us from testing the hypothesized role of context as a mediator of service and client outcomes. As a result, modifiers of uptake and changes in attitudes presented in Manuscript 4 offer rough estimates of true effects that may be overstated, and it is possible that other effects exist, but could not be detected.

Strengths

The **employment of mixed methods** is the greatest strength of this research and helped to offset many of the aforementioned limitations. Mixed methods and diverse data sources – from a systematic review of the literature on organizational context, to exploring the role of context in practice change through in-depth interviews, to the testing of hypothesized relationships through quantitative analysis of survey data – supported objectivity in the sense of creating multiple opportunities for an idea to be refuted or reinforced. Likewise, qualitative analysis inclusive of team conversation and member-checking helped situate findings in the lay knowledge of primary

care staff. This study closely followed my original research proposal, meaning hypotheses were made *a priori* and the data was collected and analyzed concurrently. As a result, while findings from one analysis provided context for interpreting and discussing findings from the next, they did not lead me to revise my original hypotheses or data analysis strategies. In this way, I was not "looking" for a particular finding when conducting analyses and maintained an objective mindset in choosing the most appropriate statistical model for each outcome according to a set plan. This is of particular importance in studies with low sample sizes, which are more susceptible to what Button et al. (2013) describe as "vibration of effects," or "the situation in which a study obtains different estimates of the magnitude of the effect depending on the analytical options it implements." Where a statistical analysis deviated from the original plan, or any points of leverage were dropped, differences in results (or lack thereof) were reported and discussed.

A second strength, related to the use of mixed methods, is that we **studied organizational context through multiple methods including qualitative in-depth interviews, quantitative statistical analysis of survey data, and qualitative configurative analysis**. This allowed us to identify specific elements of context that are important to mental health service implementation in pediatric primary care and contribute to development of a survey to assess these elements quantitatively. Such a survey is of pragmatic use to practices, given the minimal resources required to provide a snapshot of organizational context, and to researchers in testing the role of context as a moderator/mediator of more distal service and client outcomes. As Porter (1996, p. 86) has written, the act of quantification holds important virtues as a common currency for cross-cultural exchange of objective findings. That said, as he warns (p. 76), "objectivity as impersonality is often conflated with objectivity as truth," which is, one might argue, a weakness in the privileged status accorded to surveys in measuring social constructs such as culture and climate. As Petersen & Lupton (1996) have similarly pointed out, the ways in which our data were collected (e.g. our creation of categories such as past QI experience into which practice were classified, the perspectives through which we viewed culture and climate) and interpreted

(by public health researchers, QI experts, and practitioners) is subjective (e.g. is a practice "leading" or "lagging"), calling into question the "objective" nature of the resulting survey. As Brown & McCormack (2011, p. 2) state, "the complexity of context leaves it open to debate as to whether it can be measured by positivist or more interpretative naturalistic approaches of inquiry. The context in which nursing practice occurs is influenced by an infinite combination of boundaries and structures (such as staff relationships, power differentials, and organisational systems) that together shape the environment." A comprehensive evaluation of context would thus ideally pair this more positivist approach of a survey with more naturalistic forms of inquiry such as ethnographic observation, qualitative in-depth interviews, focus groups, or document research. Culture in particular is a complex, socially constructed concept commonly accepted as operating at three levels: (1) observable artifacts, (2) espoused values, and (3) underlying assumptions (Schein, 2010). While artifacts and values may to some extent be measured through qualitative interviews and quantitative survey tools, cultural assumptions, "which indicate why organizational members go about their day-to-day work," especially require ethnographic forms of inquiry (Schneider et al., 2013). See for example the framework reproduced from (Gale, Shapiro, McLeod, Redwood, & Hewison, 2014, p. 4) for measuring hospital culture (**Figure 6.1**).

Figure 6.1: Framework for measuring hospital culture repr. from Gale et al. (2014)

Table 1 Indicative types of data (*and methods for collecting data)* for each level and domain of culture in a hospital change programme

Level/Domain of culture	Patients	People	Place
Observable behaviour and artefacts *(audits, surveys, patient satisfaction monitoring, observation of activities undertaken as part of a redesign programme, content analysis of information and communication)*	Patient information leaflets/ posters; lay members of boards; methods for consultation/ involvement in redesign initiatives	Frequency and extent of consultation with or full involvement of stakeholders in decision making; modes and content of communication about potential and actual changes to the service; management structures	New building layout and facilities; reallocation of services between primary, secondary, tertiary or community health spaces; development of day surgery units; tension between consolidation and decentralization of services
Values and habits of social actors *(phenomenological interviewing, participant-observation)*	Value statements from staff and patients about initiatives to involve patients; ways of talking about everyday practice and change	Value statements from senior and frontline staff; deployment of 'change agents' to show where perceived barriers to change are; views on role of government policy	Associations made between buildings and quality; views on community; co-design practices for new clinical space
Basic assumptions *(theory, discourse analysis, ethnography)*	Power relations between staff and patients; professional and organisational structures; ideologies of care	Power relationships between clinicians and management; organisational hierarchies; professional divisions of labour	Ideologies of progress, technological development and modernization; communities of practice

Research is needed to develop a comprehensive framework for assessing the organizational context of primary care practices at the different levels at which each domain is manifested. This research contributes a survey that could be embedded as a critical element of this framework and suggests specific elements of this context to be assessed. Attention should be paid to balancing the complexity of such a framework with ease of operationalization in everyday practice.

A third strength is that **those involved primarily in training had a different relationship with practice staff than those involved primarily in research**. This allowed for more candid responses in interviews, since participants knew their anonymity was protected and that their responses would have no bearing on their progress in the Learning Collaborative. It also created an environment where implementation and research were mutually supportive: Observations from the quality improvement coordinators helped drive sampling for the qualitative interviews, and the research team in turn feed back findings through reports and debriefings to enhance the intervention. For example, as described in Manuscript 1, we developed and administered the Office Inventory and created customized reports for practices highlighting strengths and areas for improvement. These reports were reviewed with practice leads to identify potential changes to implement and test. In this way, the Office Inventory was a component of the intervention, supporting implementation *as well as* evaluation and research activities.

Both organizational context and attitudes toward mental health are so-called social constructs, with the narratives of BMW participants being produced through subjective, historically-determined interests. Thus, for example, because of the policy environment in Ohio today, some very specific themes arose. Chances are narratives would differ by states: Major themes might become minor or vice-versa, or we might identify other important Boolean combinations, given different cultures and histories. Still, a final strength is that **facets of organizational context identified are general enough to provide a lens through which to identify potential strengths and barriers** in any given primary care practice and think through how these factors might intersect in meaningful ways.

Research Implications

An area for future exploration is the staff reach and impact of each individual component of a complex intervention like BMW Wave III; in other words, what are the essential components and to what degree does each engage staff and contribute to overall intervention effects. Qualitative and quantitative data on uptake provide initial evidence of very limited reach of online modules; modest reach of the Breakthrough Series of learning sessions, PDSA cycles, and action period calls; and high reach of the academic detailing site visits. The reach of the Office Inventory was also limited, given that it was delivered only to team leaders. A promising next step would be a cluster-randomized control trial where practices are assigned to (a) data feedback, (b) Breakthrough Series, (c) site visits, or a combination thereof, with the goal of comparing the reach and impact of components/packages. Based on our study findings, practices will need to be stratified by outer/fixed context characteristics prior to randomization, to ensure the distribution of these characteristics is similar in each arm. Cluster randomization will be essential to avoiding confounding that might occur if practices were given the choice, since organization culture has shown to be predictive of what quality improvement activities practices choose to engage in (Kaissi, Kralewski, Curoe, Dowd, & Silversmith, 2004). A variant of this study, which would require a larger sample size (e.g. 40 vs. 30 practices), might include a fourth, "self-directed" condition to which practices are randomized. Could one or two leads from a practice be trained on all aspects of facilitation and provided the necessary resources ("self-directed") and would this be equally effective as facilitation by trained outsiders, as in the BMW intervention ("guided")? While results of this study strongly suggest that all-staff participation is crucial to mental health implementation, one could imagine a more self-directed version of the where a practice designates one or two leads who attend off-site trainings to learn the common factors and common elements skills; are trained in organization change management; receive their practices' data feedback and resources (e.g. worksheets, marketing materials); and are provided access to online modules to share with staff. These leads would in turn be responsible for all aspects of

facilitation at their practices. In this case it would be prudent to also stratify by culture prior to randomization, given evidence that culture affects the degree to which a practice brings about improvement in patient care through self-directed vs. facilitated learning (Dickinson et al., 2014).

Given the importance of all-staff participation to practice change, future studies are needed to explore effective engagement processes and structures, which remain a "black box" in our conceptual model. Aims and strategies are ideally chosen and refined through a process of dialogue and deliberation among change agents, including patients/clients/consumers, at all stages of an intervention (King, 2009). Methods of generating dialogue and deliberation (D&D) around organizational context deserve further exploration, and general research questions might include:

- What "engagement streams" and associated D&D processes might be used to support planning and collaboration between primary care practices and other health and social service organizations at the health system level?
- What technologies could help foster dialogue and shared vision across staff in different roles within health care organizations?
- Are there D&D techniques that could be employed during Learning Sessions to enhance knowledge-sharing and skill-building for primary care staff?

What might such an "engagement stream" look like? Brown & McCormack (2011) have demonstrated, for example, the utility of Emancipatory Action Research (EAR) as a means of bringing about practice change (in their case use of evidence-based pain management practices). Nurses participated in focus groups where they discussed data relating to their pain management practices; had a whole-team workshop to develop a shared vision; reflected upon aspects of organizational context that could be improved upon and chose three areas on which to focus; and used "facilitated reflective sessions" to develop and carry out action plans collectively. These sessions "were found to create 'psychologically safe spaces' that supported practitioners to develop effective person-centered nursing practices in complex clinical environments" (p. 14). One can imagine how such a process could be neatly integrated into a Learning Collaborative and provide a potentially powerful means of using organizational context survey data. We did not study whether and how Office Inventory survey feedback contributed to intervention outcomes.

Research has shown that a variety of factors influence the utility of survey feedback, such as timeliness and credibility (Bradley et al., 2004). When applied in a way that encourages shared understanding and action planning, it can be what Burke (2014, p. 40) describes as a "powerful" tool for organization change because "it is based on data; is involves organization members directly; it provides information about what to change and according to which priority; and it focuses change on the larger system, not on individuals." Research is needed to understand how organizational context survey data is most effectively used in primary care practice change.

Taken together, our systematic review, exploration of staff perceptions of organizational context, and testing of BMW intervention effects and the role of organizational context informed six ways in which that the Office Inventory could be revised for future use. The goal, following completion of these revisions, is to pilot the survey in another Learning Collaborative. It will then be possible to undertake a second psychometric analysis, inclusive of exploratory factor analysis of all domains, to assess its properties and further refine it into the final revised version:

1. The wording of structure/processes and technology items will be revised such that they together constitute a scale, as described in Manuscript 1. Care will be taken to ensure each item asks a single question and does not require secondhand information (Fowler, 1995).
2. Culture items will be reviewed to ensure they reflect values or artifacts and not climate perceptions. Likewise, climate items will be reviewed to ensure the level of each is clear and that they do not include artifacts (behaviors, routines, practices) that are the basis for but do not constitute climate perceptions.
3. Items will be added that address the following new content areas that were identified through narratives in Manuscript 2: all-staff participation in QI, sense of mission or passion/calling, and lived experience (culture); mental health care financing and minding the bigger picture (structures/processes); therapeutic social environment (climate); built environment and wayfinding, use of electronic medical records to monitor patient outcomes, and mechanisms

for sharing patient outcomes data (technologies). Items related to health care financing and clinical information systems excluded to meet the needs of BMW will be added back in, and items modified to be specific to the Ohio setting will be revised to be more general.

4. The short version of the PBS domain will be eliminated based on counterintuitive results found in Manuscript 3. Research is needed to re-explore the attitudes of primary care clinicians who are (or are not) engaged in mental health screening/diagnosis, intervention, and referral, and whose patients do (or not not) experience positive mental health outcomes.
5. An outer/fixed context domain, based on the results of Manuscript 4, will be added.
6. The strong association between group/developmental cultures and uptake found in Manuscript 4 reaffirms our decision to have culture items reflect more group/developmental values and suggests the same perspective might be taken for climate items. In their systematic review of climate studies, Patterson et al. (2005) mapped the most commonly-used climate dimensions to the CVF: employee welfare, autonomy, participation, communication, emphasis on training, integration, and supervisory support (group); flexibility, innovation, outward focus, and reflexivity (developmental); formalization and tradition (hierarchical); and clarity of organizational goals, effort, efficiency, quality, pressure to produce, and performance feedback (rational). New climate items will be added, and existing items modified, to reflect group/developmental dimensions and complement the culture domain.

As discussed earlier, the concepts of organizational context (as measured through Office Inventory) and attitudes toward mental health (as measured by the PBS) are produced as social phenomena. The Office Inventory is a tool to use in discourse; a common currency for discussion. But even the creation of a so-called objective tool is subjective, and the tool itself is subject to change and reinterpretation across geography and time. Further, it is just one way of measuring organizational context and one tool for those who seek to change this context. As with the PBS, ongoing research will be needed to analyze changing discourses underpinning current approaches to implementing mental health in pediatric primary care and keep the Office Inventory relevent.

Program and Policy Implications

As described in the last section, the BMW Wave III intervention supported individual and organization change primarily through Breakthrough Series and site visits. Organizational context was addressed explicitly through the common factors component of the site visits, office work-flow activities during the Learning Sessions, and through self-directed changes that practices tested in their PDSA cycles and action period calls. One might ask how, based on these study findings, we might implement a Learning Collaborative like BMW Wave III differently in the future. First, it would be beneficial to elicit all-staff dialogue and deliberation around Office Inventory data. In BMW Wave III, reports were shared with practice leads, who were responsible for sharing it with staff. If such data were available at the all-staff site visit or Learning Session, practices could be encouraged to walk through the reports as a team to become more aware of their existing contexts. We might ask staff: Are there items on which you scored exceptionally high or low? Do team perceptions of these statements differ? Why might this be? Could you identify one or two areas to focus on? Reports could also be useful in identifying strengths and barriers, and as an opportunity for all to reflect upon their visions for their practices. For example, we found that some practices were highly group/developmental, whereas other were more hierarchical/rational. Why might this be and how does it fit into their storylines? Do the leaders envision their emphases as being of benefit to achieving their organizational visions and mental health implementation aims? Why or why not? It is possible to pose these types of questions without making any value judgments. Second, qualitative findings suggest that additional learning activities be structured around changes to the built environment to facilitate client/staff communication. Third, very low uptake of online learning suggests that this component be eliminated or the format changed to engage and support learning in a fast-paced environment with brief windows for media engagement. Interviews also suggest that the format be interactive and that some topics be applicable to non-clinician members of the care team.

IRA, or level of consensus within practices, was found to moderate skill-building and confidence. This begs the question: How do we create awareness of shared perceptions relating to mental health care? What do we do in cases where survey data suggests a low level of consensus or, even worse, complete disagreement or conflict across roles? Ethnographers in the field of conflict resolution have demonstrated the value of narrative facilitation and narrative inquiry in identifying sources of conflict and consensus and facilitating sense-making and organization change (Cobb, 2016; Kurtz, 2014). As Cobb explains, the process of sense-making is "anchored in" social conditions, and by encouraging those sharing their stories to examine and ascribe meaning to this sense-making, we can change these social conditions by changing the narrative. One of the key insights that came out of qualitative interviews was how experiences of organizational context differed across roles within the same organization. In future interventions, narratives may also be of practical use to practices as staff work together to achieve a vision for how the context for mental health care can be improved.

An implication of this work for health policy is the need for new care coordination and reimbursement models that support integration of primary care and mental health services. There is great variation across states in what mental health services are reimbursed in primary care settings; what licensure/certification is required; whether same-day billing for physical and mental health conditions is allowed; and how rates differ by location and setting (Mauch, Kautz, & Smith, 2008). Under fee-for-service payment models that predominate today, reimbursement rates for mental and physical health services tend to be unequal and start-up costs to enhance systems/structures and technologies to be supportive of mental health are not typically reimbursed (O'Donnell et al., 2013). One study found that in primary care, reimbursement rates for addressing mental health concerns ($4.36/minute) or mental *and* physical health concerns ($5.86/minute) were substantially lower than physical concerns alone ($18.00/minute) (Meadows et al., 2011). Primary care staff also face what has been called a "fragmented" health care system, where in some states mental and physical health benefits are administered separately, in some

cases presenting a challenge "to integrate and coordinate mental health and substance use care with medical care despite using separate administrators" (Goodell, 2014). These issues have led to concerns about what services will be reimbursed and how to bill for them; some have also worried a mental health diagnosis could jeopardize a client's insurability (Nicholson, 2007).

The Mental Health Parity Act of 1996 and Mental Health Parity and Addiction Equity Act (MHPAEA) of 2008 prohibited differences in treatment limits, cost sharing, and in- and out-of-network covered benefits for mental health as opposed to "medical" or "surgical" benefits, and the Patient Protection and Affordable Care Act of 2010 expanded upon these laws to mandate mental health coverage as one of "ten essential benefits" (Goodell, 2014). However, it is unclear whether parity requirements extend to traditional non-managed-care Medicaid plans or whether early and periodic screening, diagnosis, and testing (EPSDT) services satisfy the parity requirement for children/youth enrolled in state Children's Health Insurance Programs (CHIP) (Serata, 2011). News reports suggest that providers are still waiting to see how parity laws will be interpreted and implemented at the state level, particularly in relation to provision of mental health services in pediatric primary care (Hartman, 2014).

In Ohio, a Mental Health Parity Law (Senate Bill 116 126th General Assembly) was passed in 2007, and the new federal MHPAEA does not preempt, but rather overlays additional benefits onto, the earlier state law (Ohio Department of Insurance, 2016). Today, some mental health service codes may be reimbursable to pediatric primary care providers through commercial insurance but are less so through public payers (Center for Integrated Health Solutions, 2014). Beginning in 2018, mental health services are expected be "carved back in" to Ohio Medicaid managed care. Ohio's 2016-2017 state budget states that "the bill repeals a prohibition against ODM including in the care management system alcohol, drug addition, and mental health services for which a board of alcohol, drug addiction, and mental health services" and that "ODM is required by the bill to begin to include alcohol, drug addiction, and mental health services in the care management system not later than January 1, 2018" (Smith, 2015). Providers in this new

network will include "community behavioral health organizations, inpatient hospitals, clinics, and specialty practitioners" (Ohio Governor's Office of Health Transformation, 2016a). Beginning this year, Ohio will also be rolling out new value-based payment models in all markets, with the goal of 80 to 90 percent of the population being enrolled in a value-based benefit program by 2018 (Ohio Governor's Office of Health Transformation, 2016b). These are promising policies with regard to supporting the implementation of mental health services in pediatric primary care.

Time will tell how mental health parity laws continue to be interpreted and applied at the state level. In the meantime, new models that might support a movement from "fee-for-service" to "fee-for-value," such as IMPACT, are emerging. The IMPACT care model for integrating depression/dysthymia treatment into primary care for older adults has demonstrated cost-effectiveness (Katon et al., 2006; Katon et al., 2005). DIAMOND has taken IMPACT a step further by implementing it in tandem with a novel payment model, testing the feasibility of bundled payments that reward positive client outcomes (Pietruszewski, 2016). The promising outcomes observed in this study suggest the potential to similarly combine a model like BMW with a value-based payment system for broader scale-up. A phased approach might first include applied research to identify core components and explore the potential of self-directed versus guided facilitation, as described above. Early adopters might in turn be engaged to support later adopters, and if conceived of as part of a larger benefits package, parallel service components (e.g. family navigators, telemedicine, consulting psychiatrists, transportation and other services) could be customized to facilitators/barriers in different contexts. The success of such a program is likely to be contingent upon how it responds to the tensions between equality and efficiency faced by providers in a rapidly-changing health care marketplace. Lutfey, Campbell, Marceau, Roland, & McKinlay (2010) foresaw that while universal coverage is necessary to improve access and address financial disincentives, it is likely to shift the pressure to organizations to contain costs. In comparing how organizational context influences clinical decision-making in the U.S. and U.K., they emphasized the need for interventions to address economic *and* social determinants;

they pointed out that finance reform alone may ignore or, worse, exaccerbate issues such as clinician autonomy, time constraints, and patient activation, which are shaped by unique politics, histories, and cultures. Results of their qualitative study very closely mirror those of our own, with Lutfey et al. describing how U.S. physicians worry about patients' financial constraints and related behaviors such as retention and adherence, and often subsidize patient care with their own resources. They write: "physicare [are] actively engaged with their organizational settings to try to induce certain types of patient behavior and procure resources that are not formally supposed to be available [and] are not simply passively responding to [the health care] system, but rather actively attemping to manipulate it for their own and their patients' gains" (p. 51). This underscores the importance of addressing macro (e.g. health care finance, poverty), meso (e.g. inner organizational context), and micro (e.g. patient-provider trust) factors in tandem and fully considering consequences likely to arise from trade-offs between equality and efficiency.

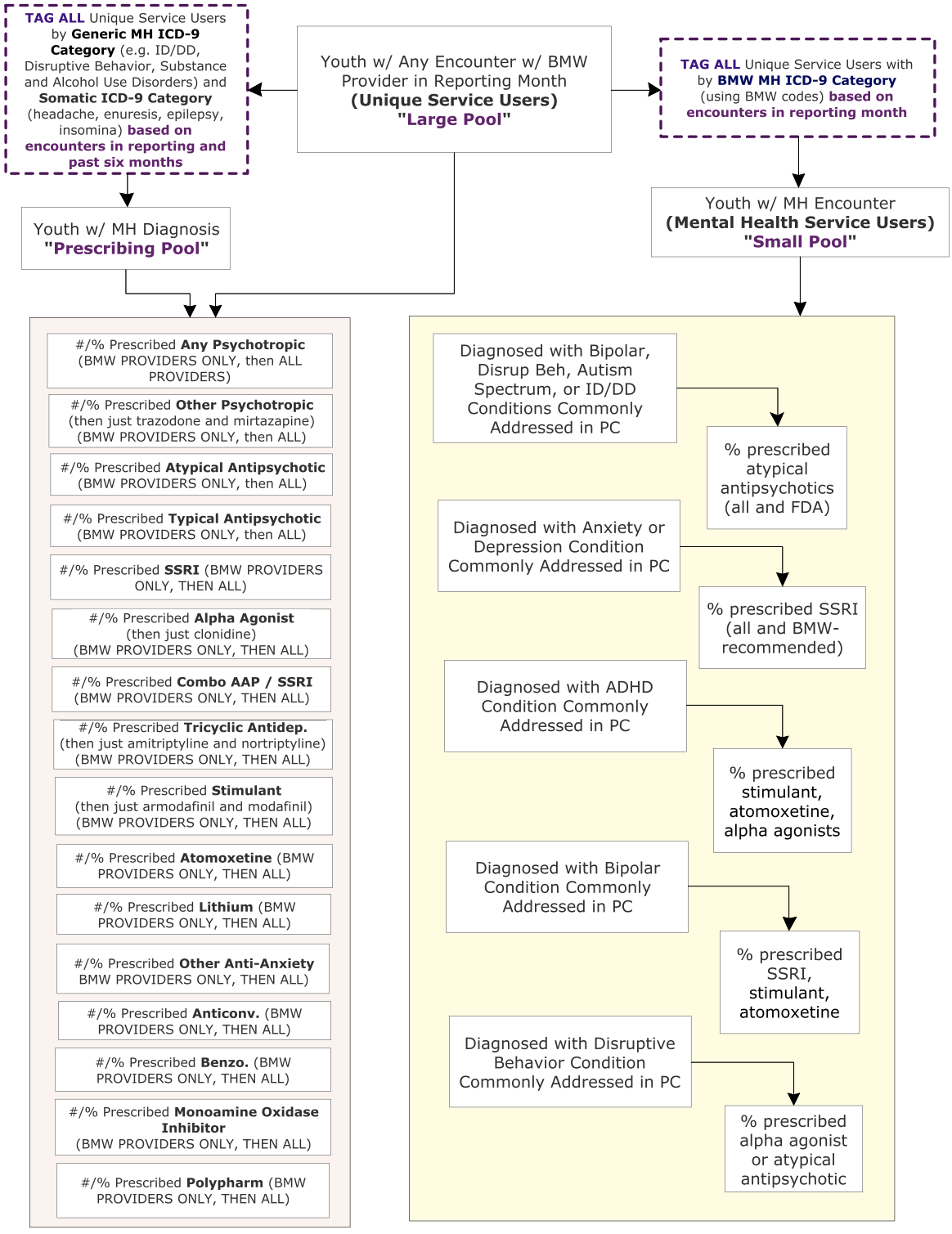
Conclusion

Pediatric primary care represents an integral public good for millions of children and youth in the United States who would otherwise have no opportunity for mental health screening and early intervention. Yet the full potential of the role of primary care providers in mental health promotion remains under-realized. Interventions to integrate mental health services into pediatric primary care can have excellent results, but are in many cases hindered by difficulties implementing evidence-based practices in real-world settings. This research used a mixed-methods approach to provide insight into the role that organizational context plays in the implementation of mental health services in pediatric primary care. Findings support the premise that organizational context, above and beyond individual provider attributes, is a determinant of uptake, attitudes, and confidence-building as it relates to mental health service implementation. This points to the benefit of putting "care in context" by taking steps to enhance the inner context (culture, systems/structures, climate, technology) of practices in preparation for or in parallel with

mental health service implementation. Our data suggest that bringing staff together to enhance culture and climate to be more supportive of mental health, and to rethink how existing structures and technologies are used to this end, creates a common ground and shared vocabulary that are vital to organization change and client mental health outcomes. Thus, all practices may benefit from facilitation that will feel more or less comfortable, depending upon the context, but that will have payoff in terms of organizational learning, even if they are not successful in attaining all of the program goals. Findings also support the premise that an intervention can have an effect on inner context over a relatively short time-span of a Learning Collaborative, and that this effect is moderated by aspects of context that are fixed or external to an organization. This points to a need for health policy change to address aspects of outer/fixed context, such as financial reimbursement models, to ensure that mental health services can be made available in our nation's most underserved communities. Organizational context deserves greater consideration not only as potential facilitator/barrier to engaging in primary care and mental health integration interventions, but perhaps more critically and more interestingly, as a factor that in and of itself is conducive to mental health and that might be a target of these interventions. We conclude that complex interventions addressing individual-, team/unit/organization, and community/region/state-level determinants are needed to successfully implement mental health services in pediatric primary care and, in turn, achieve positive service and client outcomes. Future research should test not only new models of integrated care, such as those taught in Ohio BMW Wave III, but also the feasibility of new payment models that place equal value on physical and mental health and that support the structures/processes and technologies that are integral to mental health promotion. They should also test the extent to which changes to organizational context mediate service and client outcomes. This initial study suggests that organizational context may support practice change by contributing to a therapeutic social environment through which staff motivation, effective services, and client recovery emerge.

APPENDICES

Appendix A: Medicaid/OCHIP Psychopharmacology Claims Specifications



Column	Indicator	Operational Definition
PCP Identification and Treatment of Mental Health Conditions		
***First**, pull "large pool" of unique service users w/ any encounter in month. **Second**, tag unique service users and define other pools: Tag unique service users with each applicable **BMW MH Diagnostic Category** (see separate codebook) based on ICD-9 codes appended to encounters in reporting month ("small pool"). Then tag unique service users with each applicable **Generic MH Diagnostic Category** based on ICD-9 codes appended to encounters in reporting month or prior six months ("prescribing pool"). **Third,** to aid in analysis of dual-use drugs, tag unique service users with each applicable **Somatic Diagnostic Category** (see separate codebook) based on ICD-9 codes appended to encounters in reporting or prior six months.*		
1	Unique service users ("large pool")	Number of unduplicated children/youth with any type of encounter in month
2	Unique MH service users ("small pool")	Number of unduplicated children/youth with a mental health encounter (based on **BMW MH ICD-9 Codes**) in month
3	Unique service users w/ mental health condition ("prescribing pool")	Number of unduplicated children/youth with any type of encounter in month who had a MH encounter in the current or prior six months (based on **Generic MH ICD-9 Codes**)
4	Unique service users with prior-month encounter	Number of unduplicated children/youth with any type of encounter in month who also had an encounter in prior month
5	% of unique service users with prior-month encounter	**Num:** Column 6 **Den:** Column 1
General Prescribing Patterns for Psychotropic Medications		
***Note:** We wish to look at general prescribing patterns for both our "large pool" (unique service users) and "prescribing pool" (unique service users w/ MH condition). For each row, the logic should be repeated using first the "large" and then the "prescribing" pool. Please tag unique service users according to generic classes of drugs (any psychotropic, other psychotropic, atypical antipsychotic, typical antipsychotic, SSRI, alpha agonist, combination AAP/SSRI, tricyclic antidepressant, stimulant, atomoxetine, lithium, other anti-anxiety, anticonvulsants, benzodiazepines, and polypharmacy) and by seven specific drugs (trazodone, mirtazapine, clonidine, amitriptyline, nortriptyline, armodafinil, and modafinil) as detailed in drug codebook.*		
6	Unique service users prescribed **any psychotropic medication**	Number of unique service users (large *then* prescribing pool) who fill a prescription (with *or* without BMW provider NPI) for *any* psychotropic medication in current or following month
7	% of unique service users prescribed any psychotropic medication	**Num:** Column 6 **Den:** Column 1 *then* Column 3
8	Unique service users prescribed any psychotropic medication by BMW primary care provider	Number of unique service users (large *then* prescribing pool) who fill a prescription (*with* BMW provider NPI) for *any* psychotropic medication in current or following month
9	% of unique service users	**Num:** Column 8

	prescribed any psychotropic medication by BMW primary care provider	**Den:** Column 1 *then* Column 3
10	Unique service users prescribed **other psychotropic medication**	Number of unique service users (large *then* prescribing pool) who fill a prescription (with *or* without BMW provider NPI) for other psychotropic medication in current or following month
11	% of unique service users prescribed other psychotropic medication	**Num:** Column 10 **Den:** Column 1 *then* Column 3
12	Unique service users prescribed other psychotropic medication by BMW primary care provider	Number of unique service users (large *then* prescribing pool) who fill a prescription (*with* BMW provider NPI) for other psychotropic medication in current or following month
13	% of unique service users prescribed other psychotropic medication by BMW primary care provider	**Num:** Column 12 **Den:** Column 1 *then* Column 3
After running rows 10-13 for all "other psychotropic" medications, please repeat calculations for just trazodone and for just mirtazapine.		
14	Unique service users prescribed **atypical antipsychotic**	Number of unique service users (large *then* prescribing pool) who fill a prescription (with *or* without BMW provider NPI) for atypical antipsychotic medication in current or following month
15	% of unique service users prescribed atypical antipsychotic	**Num:** Column 14 **Den:** Column 1 *then* Column 3
16	Unique service users prescribed atypical antipsychotic by BMW primary care provider	Number of unique service users (large *then* prescribing pool) who fill a prescription (*with* BMW provider NPI) for atypical antipsychotic medication in current or following month
17	% of unique service users prescribed atypical antipsychotic by BMW primary care provider	**Num:** Column 16 **Den:** Column 1 *then* Column 3
18	Unique service users prescribed **typical antipsychotic**	Number of unique service users (large *then* prescribing pool) who fill a prescription (with *or* without BMW provider NPI) for typical antipsychotic medication in current or following month
19	% of unique service users prescribed typical antipsychotic	**Num:** Column 18 **Den:** Column 1 *then* Column 3
20	Unique service users prescribed typical antipsychotic by BMW primary care provider	Number of unique (service users (large *then* prescribing pool) who fill a prescription (*with* BMW provider NPI) for typical antipsychotic medication in current or following month
21	% of unique service users	**Num:** Column 20

	prescribed typical antipsychotic by BMW primary care provider	**Den:** Column 1 *then* Column 3
22	Unique service users prescribed **SSRI** medication	Number of unique service users (large *then* prescribing pool) who fill a prescription (with *or* without BMW provider NPI) for SSRI medication in current or following month
23	% of unique service users prescribed SSRI medication	**Num:** Column 22 **Den:** Column 1 *then* Column 3
24	Unique service users prescribed SSRI by BMW primary care provider	Number of unique service users (large *then* prescribing pool) who fill a prescription (*with* BMW provider NPI) for SSRI medication in current or following month
25	% of unique service users prescribed SSRI by BMW primary care provider	**Num:** Column 24 **Den:** Column 1 *then* Column 3
26	Unique service users prescribed **alpha agonist** medication	Number of unique service users (large *then* prescribing pool) who fill a prescription (with *or* without BMW provider NPI) for alpha agonist medication in current or following month
27	% of unique service users prescribed alpha agonist medication	**Num:** Column 26 **Den:** Column 1 *then* Column 3
28	Unique service users prescribed alpha agonist medication by BMW primary care provider	Number of unique service users (large *then* prescribing pool) who fill a prescription (*with* BMW provider NPI) for alpha agonist medication in current or following month
29	% of unique service users prescribed alpha agonist by BMW primary care provider	**Num:** Column 28 **Den:** Column 1 *then* Column 3
After running rows 26-29 for all "alpha agonist" medications please repeat calculations for <u>just clonidine</u>.		
30	Unique service users prescribed **combo AAP/SSRI** medication	Number of unique service users (large *then* prescribing pool) who fill a prescription (with *or* without BMW provider NPI) for combo AAP/SSRI medication in current or following month
31	% of unique service users prescribed combo AAP/SSRI medication	**Num:** Column 30 **Den:** Column 1 *then* Column 3
32	Unique service users prescribed combo AAP/SSRI medication by BMW primary care provider	Number of unique service users (large *then* prescribing pool) who fill a prescription (*with* BMW provider NPI) for combo AAP/SSRI medication in current or following month
33	% of unique service users prescribed combo AAP/SSRI by BMW primary care provider	**Num:** Column 32 **Den:** Column 1 *then* Column 3
34	Unique service users prescribed **tricyclic**	Number of unique service users (large *then* prescribing pool) who fill a prescription (with *or* without BMW

	antidepressant medication	provider NPI) for tricyclic antidepressant medication in current or following month
35	% of unique service users prescribed tricyclic antidepressant medication	**Num:** Column 34 **Den:** Column 1 *then* Column 3
36	Unique service users prescribed tricyclic antidepressant by BMW primary care provider	Number of unique service users (large *then* prescribing pool) who fill a prescription (*with* BMW provider NPI) for tricyclic antidepressant medication in current or following month
37	% of unique service users prescribed tricyclic antidepressant by BMW primary care provider	**Num:** Column 36 **Den:** Column 1 *then* Column 3
After running rows 34-37 for all "tricyclic antidepressant" medications, please repeat calculations for <u>just amitriptyline</u> and <u>just nortriptyline</u>.		
38	Unique service users prescribed **stimulant** medication	Number of unique service users (large *then* prescribing pool) who fill a prescription (with *or* without BMW provider NPI) for stimulant medication in current or following month
39	% of unique service users prescribed stimulant medication	**Num:** Column 38 **Den:** Column 1 *then* Column 3
40	Unique service users prescribed stimulant medication by BMW primary care provider	Number of unique service users (large *then* prescribing pool) who fill a prescription (*with* BMW provider NPI) for stimulant medication in current or following month
41	% of unique service users prescribed stimulant by BMW primary care provider	**Num:** Column 40 **Den:** Column 1 *then* Column 3
After running rows 38-41 for all "stimulant" medications, please repeat calculations for <u>just armodafinil</u> and <u>just modafinil</u>.		
42	Unique service users prescribed **non-stimulant atomoxetine** medication	Number of unique service users (large *then* prescribing pool) who fill a prescription (with *or* without BMW provider NPI) for non-stimulant atomoxetine medication in current or following month
43	% of unique service users prescribed non-stimulant atomoxetine medication	**Num:** Column 42 **Den:** Column 1 *then* Column 3
44	Unique service users prescribed non-stimulant atomoxetine by BMW primary care provider	Number of unique service users (large *then* prescribing pool) who fill a prescription (*with* BMW provider NPI) for non-stimulant atomoxetine medication in current or following month
45	% of unique service users prescribed non-stimulant atomoxetine by BMW primary care provider	**Num:** Column 44 **Den:** Column 1 *then* Column 3
46	Unique service users prescribed **lithium**	Number of unique service users (large *then* prescribing pool) who fill a prescription (with *or* without BMW

	medication	provider NPI) for lithium medication in current or following month
47	% of unique service users prescribed lithium medication	**Num:** Column 46 **Den:** Column 1 *then* Column 3
48	Unique service users prescribed lithium medication by BMW primary care provider	Number of unique service users (large *then* prescribing pool) who fill a prescription (*with* BMW provider NPI) for lithium medication in current or following month
49	% of unique service users prescribed lithium by BMW primary care provider	**Num:** Column 48 **Den:** Column 1 *then* Column 3
50	Unique service users prescribed **other anti-anxiety** medication	Number of unique service users (large *then* prescribing pool) who fill a prescription (with *or* without BMW provider NPI) for other anti-anxiety medication in current or following month
51	% of unique service users prescribed other anti-anxiety medication	**Num:** Column 50 **Den:** Column 1 *then* Column 3
52	Unique service users prescribed other anti-anxiety medication by BMW primary care provider	Number of unique service users (large *then* prescribing pool) who fill a prescription (*with* BMW provider NPI) for other anti-anxiety medication in current or following month
53	% of unique service users prescribed other anti-anxiety by BMW primary care provider	**Num:** Column 52 **Den:** Column 1 *then* Column 3
54	Unique service users prescribed **anticonvulsant** medication	Number of unique service users (large *then* prescribing pool) who fill a prescription (with *or* without BMW provider NPI) for anticonvulsant medication in current or following month
55	% of unique service users prescribed anticonvulsant medication	**Num:** Column 54 **Den:** Column 1 *then* Column 3
56	Unique service users prescribed anticonvulsant medication by BMW primary care provider	Number of unique service users (large *then* prescribing pool) who fill a prescription (*with* BMW provider NPI) for anticonvulsant medication in current or following month
57	% of unique service users prescribed anticonvulsant by BMW primary care provider	**Num:** Column 56 **Den:** Column 1 *then* Column 3
58	Unique service users prescribed **benzodiazepine** medication	Number of unique service users (large *then* prescribing pool) who fill a prescription (with *or* without BMW provider NPI) for benzodiazepine medication in current or following month
59	% of unique service users prescribed benzodiazepine	**Num:** Column 58 **Den:** Column 1 *then* Column 3

	medication	
60	Unique service users prescribed benzodiazephine medication by BMW primary care provider	Number of unique service users (large *then* prescribing pool) who fill a prescription (*with* BMW provider NPI) for benzodiazepine medication in current or following month
61	% of unique service users prescribed benzodiazepine by BMW primary care provider	**Num:** Column 60 **Den:** Column 1 *then* Column 3
62	Unique service users prescribed **monoamine oxidase inhibitor** medication	Number of unique service users (large *then* prescribing pool) who fill a prescription (with *or* without BMW provider NPI) for monoamine oxidase inhibitor medication in current or following month
63	% of unique service users prescribed monoamine oxidase inhibitor medication	**Num:** Column 62 **Den:** Column 1 *then* Column 3
64	Unique service users prescribed monoamine oxidase inhibitor medication by BMW primary care provider	Number of unique service users (large *then* prescribing pool) who fill a prescription (*with* BMW provider NPI) for monoamine oxidase inhibitor medication in current or following month
65	% of unique service users prescribed monoamine oxidase inhibitor by BMW primary care provider	**Num:** Column 64 **Den:** Column 1 *then* Column 3
66	Unique service users prescribed **polypharmacy**	Number of unique services users (large *then* prescribing pool) who fill four (4) or more concurrent prescriptions (with *or* without BMW provider NPI) for psychotropic medication in timeframe based on past studies.
67	% of unique service users prescribed **polypharmacy**	**Num:** Column 66 **Den:** Column 1 *then* Column 3
68	Unique service users prescribed polypharmacy by BMW primary care provider	Number of unique services users (large *then* prescribing pool) who fill four (4) or more concurrent prescriptions (*with* BMW provider NPI on two or more claims) for psychotropic medication in timeframe based on past studies.
69	% of unique service users prescribed polypharmacy by BMW primary care provider	**Num:** Column 68 **Den:** Column 1 *then* Column 3
Prescribing Patterns for Specific Mental Health Conditions		
Unless specific medications are listed, drug classes correspond to the full list of qualifying codes for the class as outlined in our drug codebook. In this section we focus on our "small pool" of service users.		
70	Unique service users newly diagnosed with one or more conditions for which an	Number of unique service users who have an encounter in reporting month with an associated ICD-9 diagnostic code/tag for a mental health condition falling into one of the

	atypical antipsychotic medication may be appropriate	following categories: bipolar disorder, disruptive behavior disorder, autism spectrum disorder, and intellectual disability/developmental delay
71	% of unique service users newly diagnosed with "appropriate" conditions prescribed an atypical antipsychotic medication by BMW primary care provider	**Num:** Number of unique service users newly diagnosed with one or more conditions for which an atypical antipsychotic medication may be appropriate and who fill a prescription (*with* BMW provider NPI) for an atypical antipsychotic medication in the current or following month **Den:** Column 70
72	% of unique service users newly diagnosed with "appropriate" conditions prescribed atypical antipsychotic medication with FDA indication by BMW primary care provider	**Num:** Number of unique service users newly diagnosed with one or more conditions for which an atypical antipsychotic medication may be appropriate and who fill a prescription (*with* BMW provider NPI) for aripiprazole/abilify or risperidone/risperdol in the current or following month **Den:** Column 70
73	Unique service users newly diagnosed with **anxiety** or **depression**	Number of unique service users who have an encounter in reporting month with an associated ICD-9 code/tag for anxiety or depression
74	% of unique service users newly diagnosed with anxiety or depression who are prescribed any SSRI by BMW primary care provider	**Num:** Number of unique service users newly diagnosed with anxiety or depression who fill an SSRI prescription (*with* BMW provider NPI) in the current or following month **Den:** Column 73
75	% of unique service users newly diagnosed with anxiety or depression who are prescribed a BMW-recommended SSRI by BMW primary care provider	**Num:** Number of unique service users newly diagnosed with anxiety or depression who fill a sertraline, fluoxetine, or escitalopram prescription (*with* BMW provider NPI) in the current or following month **Den:** Column 73
76	Unique service users newly diagnosed with **ADHD**	Number of unique service users who have an encounter in reporting month with an associated ICD-9 code/tag for ADHD
77	% of unique service users newly diagnosed with ADHD who are prescribed a stimulant medication by BMW primary care provider	**Num:** Number of unique service users newly diagnosed with ADHD who fill a prescription (*with* BMW provider NPI) for a stimulant medication in the current or following month **Den:** Column 76
78	% of unique service users newly diagnosed with ADHD who are prescribed an alpha agonist medication by BMW primary care provider	**Num:** Number of unique service users newly diagnosed with ADHD who fill a prescription (*with* BMW provider NPI) for an alpha agonist medication in the current or following month **Den:** Column 76
79	% of unique service users	**Num:** Number of unique service users newly diagnosed

	newly diagnosed with ADHD who are prescribed atomoxetine by BMW primary care provider	with ADHD who fill a prescription (*with* BMW provider NPI) for atomoxetine in the current or following month **Den:** Column 76
80	Unique service users newly diagnosed with a **disruptive behavior disorder**	Number of unique service users who have an encounter in reporting month with an ICD-9 code/tag for disruptive behavior disorder
81	% of unique service users newly diagnosed with a disruptive behavior disorder who are prescribed an alpha agonist medication by BMW primary care provider	**Num:** Number of unique service users newly diagnosed with a disruptive behavior disorder who fill a prescription (*with* BMW provider NPI) for alpha agonist medication in the current or following month **Den:** Column 80
82	% of unique service users newly diagnosed with a disruptive behavior disorder who are prescribed an atypical antipsychotic medication by BMW primary care provider	**Num:** Number of unique service users newly diagnosed with a disruptive behavior disorder who fill a prescription (*with* BMW provider NPI) for atypical antipsychotic medication in the current or following month **Den:** Column 80
83	Unique service users newly diagnosed with **bipolar disorder**	Number of unique service users who have an encounter in reporting month with an associated ICD-9 code/tag for bipolar disorder
84	% of unique service users newly diagnosed with bipolar disorder who are prescribed an SSRI or ADHD medication by BMW primary care provider	**Num:** Number of unique MH service users newly diagnosed with bipolar disorder who fill a prescription (*with* BMW provider NPI) for an SSRI, stimulant medication, or atomoxetine in the current or following month **Den:** Column 83

Appendix B: Statement to Interview Participants

You have been invited to take part in a study concerning your experiences with the Ohio Building Mental Wellness (BMW) on-site training(s). This study will be conducted by Melissa King of Johns Hopkins School of Public Health. She is a member of the BMW team. We are conducting this study to evaluate satisfaction with the on-site trainings and to see how you are applying what you learned. We're asking you to join because you participated in a site visit.

Participating in an Interview

If you agree to participate, you will be asked to take part in an interview. To protect your privacy, the interview will be scheduled at a time and location of your choice. You also have the alternative option of a telephone interview. With your permission, the interview will be audio recorded. If you do not want the interview recorded, the interviewer will take notes instead. During the interview, you will be asked for some general feedback on the training. You will also be asked about what skills you learned, what it was like applying those skills, and about some of the changes that have occurred at your practice since the start of the Collaborative. Finally, you will be asked for your thoughts about additional resources that would support your team.

The interview will take 30-45 minutes. You will be provided a $25.00 Target gift card at the conclusion of the interview. Participation in the interview is voluntary. You may refuse to participate or withdraw at any time without penalty. Nonparticipation or withdrawal will not affect any relationship you might have with Johns Hopkins University or the BMW team.

Potential Risks and Benefits

There are no physical risks of participating in this study. All research projects carry some risk that information about you may become known to people outside of the study. Our study staff are trained to protect your confidentiality. You have been assigned a study ID number.
This number will be used to label all study materials. Audio files, transcriptions, and a list linking names with study numbers will be secured on a password-protected computer. The list will allow us to re-contact participants for follow-up interviews. We will destroy these files one year following completion of the study. We will not discuss your information with people outside of the study. Study findings will be aggregated across practices in each Learning Session before being shared. In any publication regarding this study, your identity will not be revealed.

Aside from the gift card, you will receive no direct benefit from participation. However, your participation may help others. We will use the information you provide to improve BMW.

Questions or Concerns?

If there is anything about the study or your participation that is unclear or that you do not understand, if you have questions, or if you wish to report a research-related problem, please contact the Principal Investigator, Rebecca Baum, MD, at 614-722-2435.

If you have questions about your rights as a research participant, have complaints about the study, cannot reach Dr. Baum, or would rather speak to someone else, please contact the Institutional Review Board at National Children's Hospital at 614-722-2708.

Appendix C: Example Baseline Office Inventory Report

Ohio Building Mental Wellness, Wave III Office Inventory Pre-Collaborative Results: Learning Session Group 2, Practice 7

This report summarizes results of the Office Inventory completed by staff at your practice prior to the start of BMW. Its purpose is to aid in assessing ways in which your office's systems/structures, technologies, and culture support mental health care. It also serves to gauge staff's experiences and beliefs as they relate to addressing mental health concerns.

Indicator 1: Office Structures/Processes

The following 15 items relate to systems of care delivery and related structures such as staff roles and community partnerships. For each item you can compare your practice's overall score to that of other BMW-participating practices. Items were rated on a scale of 1 to 10 and converted to a percentage. **The maximum possible score is 100% and minimum is 10%.**

Community Resources		Practice Score (n=22 staff)	Learning Collab Ave (n=9 sites)	Learning Collab Range (n=9 sites)
		68%	66%	50 to 80%
1	My practice has a comprehensive **inventory of community resources** that is both up-to-date and accessible.	74%	68%	56 to 77%
2	My practice is **knowledgeable about eligibility requirements, contact points, and services** of the programs and providers listed in the last question.	67%	66%	47 to 83%
3	My practice has developed **collaborative relationships** with school- and community-based providers of key services.	65%	65%	40 to 86%

Delivery System Redesign		Practice Score (n=22 staff)	Learning Collab Ave (n=9 sites)	Learning Collab Range (n=9 sites)
		64%	60%	37 to 69%
4	My practice has systems in place and **staff roles** assigned to effectively monitor patients' progress (e.g. check on referral completion, periodic telephone contact with family and therapist, periodic functional assessment, periodic behavioral scales from classroom teachers and parents, communication to and from care coordinators).	73%	65%	33 to 86%
5	My practice **coordinates** with youth, families, schools, agency personnel, and any involved specialists whenever developing and implementing plans of care for children and adolescents with mental health concerns.	62%	64%	57 to 76%

6	My practice has adequate **office procedures to support collaboration** (e.g. routines for requesting parental consent to exchange information with specialists and schools, faxback forms for specialist feedback, psychosocial history accompanying foster children).	69%	70%	53 to 91%
7	My practice is networked with the **Pediatric Psychiatry Network (PPN)** and has adequate knowledge of how to access the PPN when decision support is needed.	43%	44%	23 to 63%
8	My practice has adequate systems in place to collect and score **mental health and substance use screening** and assessment tools at or prior to routine health supervision visits and visits scheduled for a mental health concern.	64%	58%	23 to 73%
9	My practice has a **crisis plan** in place that is effective for responding to psychiatric emergencies, including suicidality.	69%	59%	33 to 80%

Child and Family Support		**Practice Score** (n=22 staff)	**Learning Collab Ave** (n=9 sites)	**Learning Collab Range** (n=9 sites)
		72%	71%	59 to 81%
10	My practice has adequate strategies in place to actively promote social and emotional development as part of **anticipatory guidance**.	70%	66%	53 to 77%
11	People at my practice have good **"first contact" skills** to help families feel welcome and respected.	82%	86%	79 to 97%
12	My practice promotes the importance of mental health by making relevant **information available to patients/families** through materials such as posters and handouts.	60%	63%	46 to 74%
13	People at my practice promote the importance of mental health by showing their concern and incorporating **conversations about mental health** into each office visit.	70%	71%	51 to 83%
14	People in my practice **actively elicit** mental health and substance use **concerns**; **assess** patients' and families' **readiness** to address them; and **engage** children, adolescents, and **families in planning** their own mental health care at their own pace.	69%	64%	49 to 76%
15	My practice is prepared to support families through **referral assistance** and provide **advocacy** in the mental health referral process.	82%	78%	66 to 93%

Indicator 2: Office Technologies

The following five items relate to clinical staff ratings of technologies, such as clinical information systems and decision support tools, used in providing mental health care to patients. For each item you can compare your practice's overall score to that of other BMW-participating practices. Items were rated "agree" or "disagree" and scores represent the percent of clinical staff who agreed with the statement. **The maximum possible score is 100 percent agree and the minimum possible is 0 percent agree.**

		Practice Pct Agree (n=10 staff)	**LC Average Pct Agree** (n=9 sites)	**LC Ave. Pct Agree Range** (n=9 sites)
		56%	55%	27 to 80%
1	I use psychosocial history and validated **screening and assessment tools** at preventive visits to identify and evaluate children and adolescents with mental health concerns and/or to monitor their progress in care.	40%	61%	40 to 83%
2	I have access to reliable, current sources of **information concerning diagnostic classification and treatment** (psychosocial and pharmacological) of mental health and substance use conditions.	70%	55%	0 to 100%
3	I have access to reliable, current sources of **information about the safety and efficacy of complementary and alternative therapies** often used by children and families for treatment of mental health and substance use conditions.	40%	47%	0 to 100%
4	I have **access to a psychiatrist** with expertise in children and adolescents for consultation and guidance in assessment and management of patients' mental health and substance use conditions.	60%	47%	0 to 100%
5	I have **resources available** to help patients manage their mental health concerns at home, at school, and in their communities.	70%	67%	0 to 100%

Indicator 3: Office Culture Part I

The following six items relate to aspects of office culture – the values and norms shared among staff in your practice – that might support the delivery of family-centered mental health services. For each item you can compare your practice's overall score to that of other BMW-participating practices. Items were rated on a scale of 1 to 10 and converted into a percentage. **The maximum possible score is 100% and minimum is 10%.**

		Practice Score (n=22 staff)	Learning Collab Ave (n=9 sites)	Learning Collab Range (n=9 sites)
		69%	73%	56 to 85%
1	People in my practice treat the **mental health** of patients as a **primary goal** of their work.	64%	64%	44 to 77%
2	People in my practice **value research** relating to the importance of early detection and treatment of mental health conditions.	67%	69%	61 to 83%
3	Responsibility for mental health care is **shared across all roles and levels** of our practice.	64%	68%	49 to 87%
4	If a co-worker were to change his/her work routine to enhance the mental health care of our patients, this change would be **supported and rewarded** by management.	70%	80%	58 to 92%
5	My co-workers are **supportive of people facing mental health challenges**, demonstrating sensitivity to cultural differences and avoiding stigmatizing language.	71%	84%	70 to 93%
6	There are one or more people in my practice who I would consider **"champions"** for the use of new mental health care practices and tools.	79%	74%	56 to 93%

References for Indicator 4 on Page 5:

Competing values culture type definitions and characteristics are reproduced directly from: Shortell, S.M. (1992) Quality Improvement Implementation Survey. Health Policy and Management, University of California, Berkeley, 15 pp. Available at: http://shortellresearch.berkeley.edu

Source for background on group and developmental cultures: Shortell, S.M. et al. (1995) Assessing the Impact of Continuous Quality Improvement / Total Quality Management: Concept versus Implementation, *Health Services Research*, *30*(2), 377-401.

Source for Office Culture Domain Part II used in Office Inventory: Quinn, R.E., and J.R. Kimberly (1984) Paradox, Planning, and Perseverance: Guidelines for Managerial Practice. In R.E. Quinn & J.R. Kimberly (Eds.), *Managing Organization Transitions* (pp. 295-213). Homewood, IL: Dow Jones-Irwin.

Indicator 4: Office Culture Part II

The following chart summarizes where your practice falls in the Competing Values Framework, which positions practices on a continuum of four culture types. Research suggests that practices with more developmental- and group-type cultures (a high score for these types being about 50 or more) tend to be more flexible and open to change.

Practice	Group Score		Developmental Score		Hierarchical Score		Rational Score	
	Mean	Range	Mean	Range	Mean	Range	Mean	Range
LC (n=9)	45	35-69	17	13-21	18	5-29	20	12-25
P1	37	20-72	14	9-24	23	12-44	25	7-38
P2	40	14-82	20	8-32	17	2-48	24	0-52
P3	42	22-64	17	7-32	17	2-25	25	2-44
P4	69	64-76	14	9-23	5	2-10	12	11-14
P5	45	25-82	17	4-39	20	5-28	17	4-29
P6	44	21-78	21	5-40	15	0-28	19	4-43
P7 (n=21)	35	6-64	18	2-33	27	8-49	20	5-32
P8	54	25-79	17	7-25	11	4-25	18	2-30
P9	39	0-74	13	0-26	29	14-50	19	0-50

Group: The extent to which the respondent perceives the culture to be based on norms and values associated with affiliation, teamwork, and participation.

Developmental: The extent to which the respondent perceives the culture to be based on risk-taking innovation and change.

Hierarchical: The extent to which the respondent perceives the culture to reflect the values and norms associated with bureaucracy.

Rational: The extent to which the respondent perceives the culture to emphasize efficiency and achievement.

Culture Type	Emphasis	Leadership Style	Goals	Decision-Making
Group	Flexibility, trust, belonging, participation	Participative and supportive	Development of human potential	Seek out diverse opinions, integrate viewpoints
Developmental	Flexibility, growth, resource acquisition	Entrepreneurial, idealist, risk-taking	Growth, develop new markets	Intuition; made quickly, adjusted as needed
Hierarchical	Efficiency, following rules, uniformity, coordination, stability	Conservative, cautious, detail-oriented	Control, stability, and efficiency	Data used to determine and justify single-best solution
Rational	Productivity, performance, achieving goals	Directive, goal-oriented	Planning, efficiency, productivity	Focus on general principles; data-oriented, rarely changed

Indicator 5: Office Climate

The following ten questions refer to staff's self-reported personal experiences of what it's like working in your practice. The wording below is from the clinician version of the Office Inventory; questions 1, 2, 4, 7 and 8 were worded slightly differently for non-clinical staff. For each item you can compare your practice's overall score to that of other BMW-participating practices. Items were rated on a scale of 1 to 10 and converted into a percentage. **The maximum possible score is 100% and minimum is 10%.**

		Practice Score (n=21 staff)	**Learning Collab Ave** (n=9 sites)	**Learning Collab Range** (n=9 sites)
		65%	71%	62 to 77%
1	I have the opportunity to make **full use** of my **knowledge** and skills in caring for patients with mental health concerns.	58%	68%	51 to 82%
2	I'm **unsure of my role** in caring for patients with behavioral, developmental, or emotional concerns (reverse-coded).	65%	63%	40 to 81%
3	My job makes a meaningful contribution and is **important to our practice**.	86%	87%	80 to 93%
4	Front-desk and other support staff are **helpful to me** in addressing behavioral, developmental, and emotional concerns of patients.	69%	79%	68 to 89%
5	I frequently feel **overwhelmed** by work demands (reverse-coded).	55%	65%	47 to 83%
6	I have **autonomy** in making decisions without asking permission from others.	56%	68%	54 to 87%
7	I am able to **provide continuity** of mental health care to my patients.	48%	59%	48 to 71%
8	I am familiar with and have **trusting relationships** with my patients.	86%	80%	70 to 92%
9	It's **difficult** for me to **spend extra time** with patients to address mental health concerns, since there is rarely adequate time in primary care practice (reverse-coded).	61%	59%	46 to 90%
10	I am able to **safely express** my ideas, criticism, opinions, and suggestions regarding our practice to co-workers and/or management.	60%	77%	60 to 93%

Indicator 6: Clinician Beliefs

The following 14 items relate to clinicians' attitudes and beliefs about psychosocial aspects of care. The purpose of this scale is to gauge how clinical staff feel about patients in relation to behavioral health and their motivation for engaging them. For each item you can compare your practice's overall score to that of other BMW-participating practices. Items were rated on a scale of 1 to 5. Lower scores are better: **The best possible score is 1 and lowest is 5.**

		Practice Score (n=8 staff)	**Learning Collab Ave** (n=9 sites)	**Learning Collab Range** (n=9 sites)
		2.30	2.06	1.38 to 2.77
1	My patients and/or their caregivers do not want me to investigate psychosocial problems.	1.88	2.16	1.75 to 3.00
2	I cannot help my patients with problems I have not experienced myself.	1.50	1.50	1.00 to 2.00
3	I focus on organic disease because I cannot treat psychosocial problems.	2.00	1.71	1.00 to 2.50
4	If I address psychosocial issues patients will reject these issues and never return.	2.13	1.57	1.00 to 2.13
5	I feel guilty probing the psychosocial concerns of my patients	1.75	1.88	1.00 to 3.00
6	I don't find satisfaction in treating psychosocial problems in patients in my practice.	2.17	2.02	1.00 to 3.67
7	I cannot help a patient with a psychosocial problem I have not resolved myself.	2.00	1.56	1.00 to 2.50
8	The psychosocial problems we all experience do not significantly influence the onset or course of disease.	1.75	1.73	1.00 to 2.60
9	One reason I do not consider information about psychosocial problems is the limited time I have available.	3.50	2.77	1.50 to 4.00
10	Evaluating/treating psychosocial problems will cause me to be more overburdened.	2.75	2.48	1.25 to 3.67
11	So many issues have to be investigated when seeing patients that I do not always consider psychosocial factors.	3.50	2.72	1.50 to 4.00
12	Investigating issues of psychosocial problems decreases my efficiency.	3.25	2.49	1.50 to 4.00
13	Patients will become more dependent on me if I raise psychological concerns.	2.25	2.12	1.40 to 3.50
14	Exploring psychosocial issues with the patient often causes me pain.	1.88	2.12	1.50 to 2.80

Source for Physician Belief Scale used in Office Inventory: Ashworth, C.D., Williamson, P., and Montano, D. (1984) A Scale to Measure Physician Beliefs About Psychosocial Aspects of Patient Care. *Social Science & Medicine*, *19*(11), 1235-1238. Note: The original wording for Item 6 was "I find great satisfaction…" It was altered for this report so as to facilitate interpretation of the reversed score.

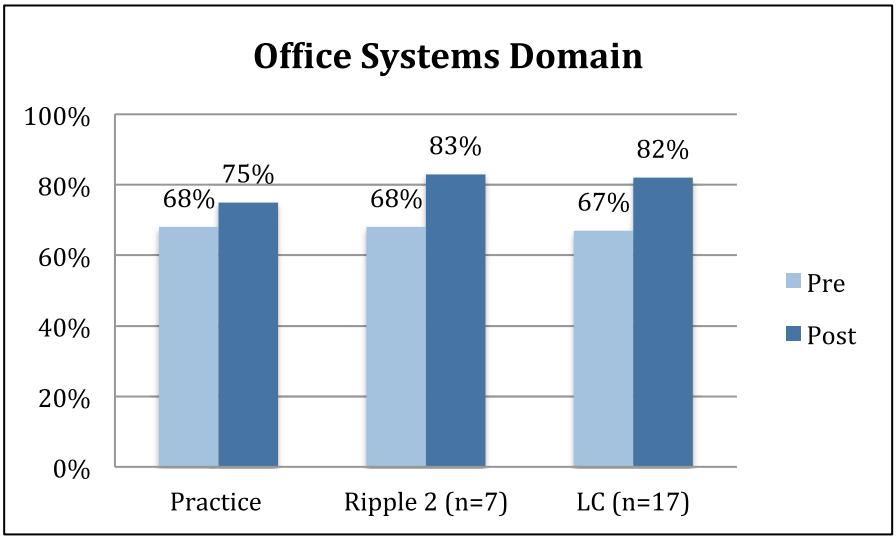
Appendix C: Example Post Office Inventory Report

Ohio Building Mental Wellness, Wave III Office Inventory Post-Collaborative Results: Learning Session Group 2, Practice 7

This report summarizes results of the Office Inventory completed by staff at your practice at the beginning and end of the BMW Learning Collaborative. The pre data served to help your practice assess ways in which your office's systems, technologies, and culture support mental health care. It also served to gauge staff's experiences and beliefs as they relate to addressing mental health concerns. The purpose of this "post" report is to identify areas in which your practice experienced change over the course of the Learning Collaborative.

Indicator 1: Office Systems

The following 15 items relate to systems of care delivery and related structures such as staff roles and community partnerships. For the overall domain, you can compare your practice's total scores "pre" and "post" to that of other BMW-participating practices. You can in turn see which specific items may have changed. Items were rated on a scale of 1 to 10 and converted to a percentage. **The maximum possible score is 100% and minimum is 10%.**



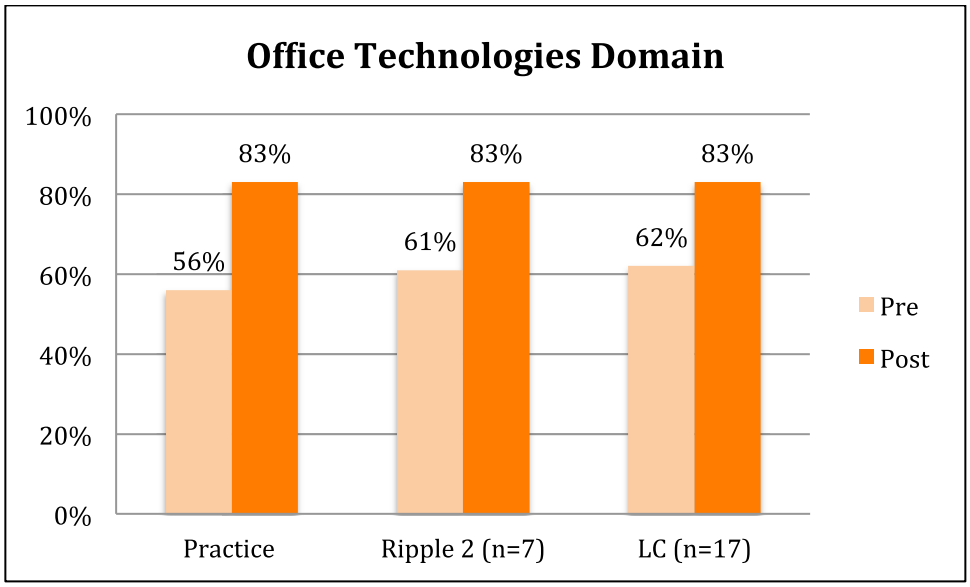
Community Resources		Practice Pre Score (n=22 staff)	Practice Post Score (n=13 staff)
		68%	72%
1	My practice has a comprehensive **inventory of community resources** that is both up-to-date and accessible.	74%	76%
2	My practice is **knowledgeable about eligibility requirements, contact points, and services** of the programs and providers listed in the last question.	67%	70%
3	My practice has developed **collaborative relationships** with school- and community-based providers of key services.	65%	69%

Delivery System Redesign		Practice Pre Score (n=22 staff)	Practice Post Score (n=13 staff)
		64%	71%
4	My practice has systems in place and **staff roles** assigned to effectively monitor patients' progress (e.g. check on referral completion, periodic telephone contact with family and therapist, periodic functional assessment, periodic behavioral scales from classroom teachers and parents, communication to and from care coordinators).	73%	82%
5	My practice **coordinates** with youth, families, schools, agency personnel, and any involved specialists whenever developing and implementing plans of care for children and adolescents with mental health concerns.	62%	74%
6	My practice has adequate **office procedures to support collaboration** (e.g. routines for requesting parental consent to exchange information with specialists and schools, faxback forms for specialist feedback, psychosocial history accompanying foster children).	69%	76%
7	My practice is networked with the **Pediatric Psychiatry Network (PPN)** and has adequate knowledge of how to access the PPN when decision support is needed.	43%	51%
8	My practice has adequate systems in place to collect and score **mental health and substance use screening** and assessment tools at or prior to routine health supervision visits and visits scheduled for a mental health concern.	64%	74%
9	My practice has a **crisis plan** in place that is effective for responding to psychiatric emergencies, including suicidality.	69%	68%

Child and Family Support		Practice Pre Score (n=22 staff)	Practice Post Score (n=13 staff)
		72%	81%
10	My practice has adequate strategies in place to actively promote social and emotional development as part of **anticipatory guidance**.	70%	79%
11	People at my practice have good **"first contact" skills** to help families feel welcome and respected.	82%	85%
12	My practice promotes the importance of mental health by making relevant **information available to patients / families** through materials such as posters and handouts.	60%	75%
13	People at my practice promote the importance of mental health by showing their concern and incorporating **conversations about mental health** into each office visit.	70%	81%
14	People in my practice **actively elicit** mental health and substance use **concerns**; **assess** patients' and families' **readiness** to address them; and **engage** children, adolescents, and **families in planning** their own mental health care at their own pace.	69%	80%
15	My practice is prepared to support families through **referral assistance** and provide **advocacy** in the mental health referral process.	82%	88%

Indicator 2: Office Technologies

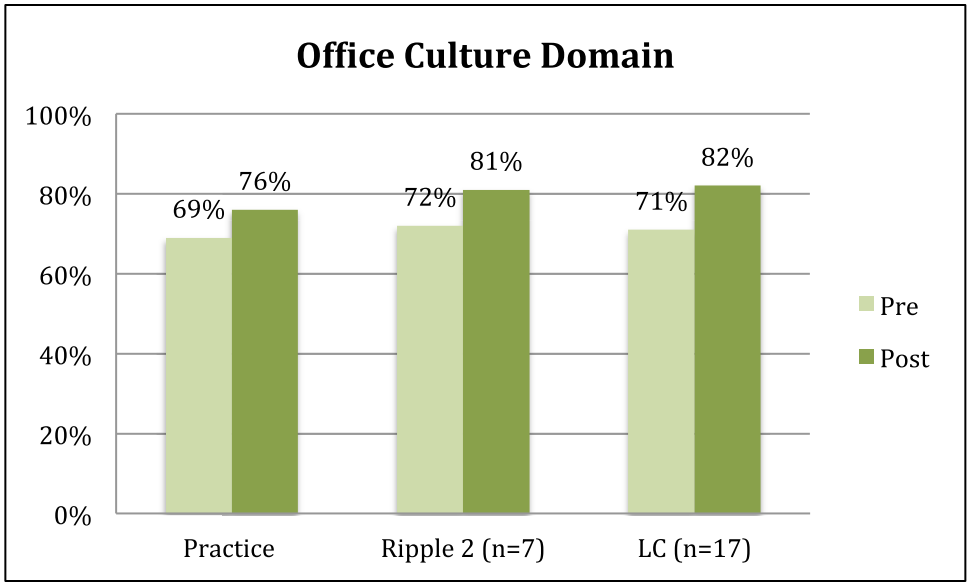
The following five items relate to clinical staff ratings of technologies, such as clinical information systems and decision support tools, used in providing mental health care to patients. For the overall domain, you can compare your practice's total scores "pre" and "post" to that of other BMW-participating practices. You can in turn see which specific items may have changed. Items were rated "agree" or "disagree" and scores represent the percent of clinical staff who agreed with the statement. **The maximum possible score is 100 percent agree and the minimum possible is 0 percent agree.**



		Practice % Agree Pre (n=10 staff)	Practice % Agree Post (n=7 staff)
		56%	83%
1	I use psychosocial history and validated **screening and assessment tools** at preventive visits to identify and evaluate children and adolescents with mental health concerns and/or to monitor their progress in care.	40%	71%
2	I have access to reliable, current sources of **information concerning diagnostic classification and treatment** (psychosocial and pharmacological) of mental health and substance use conditions.	70%	100%
3	I have access to reliable, current sources of **information about the safety and efficacy of complementary and alternative therapies** often used by children and families for treatment of mental health and substance use conditions.	40%	71%
4	I have **access to a psychiatrist** with expertise in children and adolescents for consultation and guidance in assessment and management of patients' mental health and substance use conditions.	60%	86%
5	I have **resources available** to help patients manage their mental health concerns at home, at school, and in their communities.	70%	86%

Indicator 3: Office Culture Part I

The following six items relate to aspects of office culture – the values and norms shared among staff in your practice – that might support the delivery of family-centered mental health services. For the overall domain, you can compare your practice's total scores "pre" and "post" to that of other BMW-participating practices. You can in turn see which specific items may have changed. Items were rated on a scale of 1 to 10 and converted into a percentage. **The maximum possible score is 100% and minimum is 10%.**



		Practice Pre Score (n=22 staff)	Practice Post Score (n=13 staff)
		69%	76%
1	People in my practice treat the **mental health** of patients as a **primary goal** of their work.	64%	68%
2	People in my practice **value research** relating to the importance of early detection and treatment of mental health conditions.	67%	72%
3	Responsibility for mental health care is **shared across all roles and levels** of our practice.	64%	73%
4	If a co-worker were to change his/her work routine to enhance the mental health care of our patients, this change would be **supported and rewarded** by management.	70%	69%
5	My co-workers are **supportive of people facing mental health challenges**, demonstrating sensitivity to cultural differences and avoiding stigmatizing language.	71%	78%
6	There are one or more people in my practice who I would consider **"champions"** for the use of new mental health care practices and tools.	79%	92%

Indicator 4: Office Culture Part II

The following chart summarizes where your practice falls in the Competing Values Framework, which positions practices on a continuum of four culture types. Research suggests that practices with more developmental- and group-type cultures (a high score for these types being about 50 or more) tend to be more flexible and open to change.
Pre and post data is presented, although change on this domain was not expected.

Practice	Group Score		Developmental Score		Hierarchical Score		Rational Score	
	Mean Pre	Mean Post	Mean Pre	Mean Post	Mean Pre	Mean Post	Mean Pre	Mean Post
LC (n=17)	39	41	18	19	22	20	21	20
Ripple 2 (n=7)	40	38	17	19	21	20	20	22
P1 Pre (n=9) Post (n=8)	52	57	19	19	17	12	12	12
P2 Pre (n=6) Post (n=8)	54	48	21	19	11	19	13	14
P3 Pre (n=5) Post (n=6)	37	28	22	22	23	23	18	26
P4 Pre (n=10) Post (n=6)	27	36	14	11	27	30	32	23
P5 Pre (n=17) Post (n=10)	27	41	26	23	22	19	24	17
P6 Pre (n=10) Post (n=6)	44	38	16	24	19	18	20	19
P7 Pre (n=19) Post (n=16)	38	43	14	18	30	23	17	16
P8 Pre (n=6) Post (n=9)	37	31	14	24	23	18	25	22
P9 Pre (n=10) Post (n=6)	40	24	20	22	17	23	24	31
P10 Pre (n=9) Post (n=6)	42	45	17	21	17	13	25	22
P12 Pre (n=7) Post (n=5)	45	46	17	15	20	24	17	14
P13 Pre (n=29) Post (n=13)	44	44	21	22	15	18	19	15
P14 Pre (n=21) Post (n=13)	35	33	18	13	27	24	20	30
P16 Pre (n=8) Post (n=6)	39	44	13	17	29	18	19	21
P18 Pre (n=23) Post (n=16)	39	37	15	19	24	20	21	22
P19 Pre (n=14) Post (n=9)	44	50	12	13	24	19	20	17
P21 Pre (n=5) Post (n=5)	28	45	27	15	21	21	23	19

Group: The extent to which the respondent perceives the culture to be based on norms and values associated with affiliation, teamwork, and participation.

Developmental: The extent to which the respondent perceives the culture to be based on risk-taking innovation and change.

Hierarchical: The extent to which the respondent perceives the culture to reflect the values and norms associated with bureaucracy.

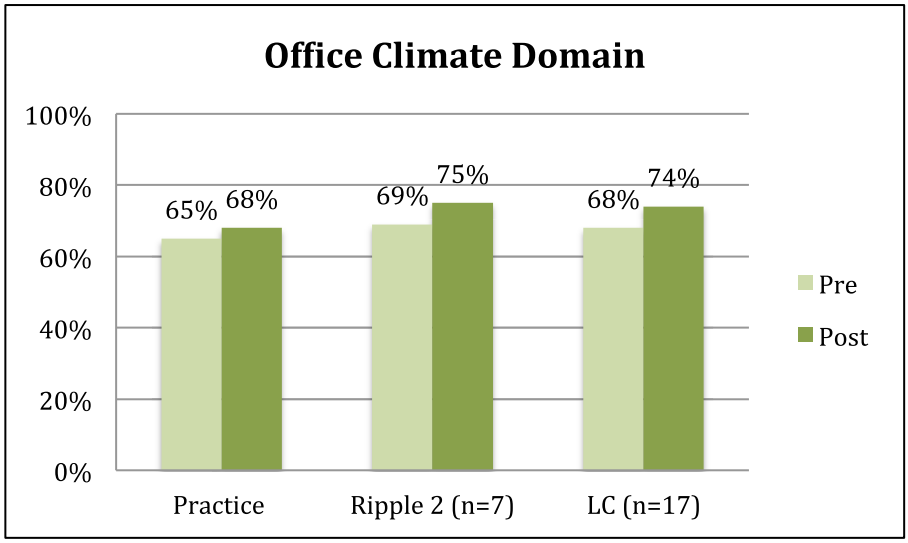
Rational: The extent to which the respondent perceives the culture to emphasize efficiency and achievement.

Competing values culture type definitions and characteristics are reproduced directly from: Shortell, S.M. (1992) Quality Improvement Implementation Survey. Health Policy and Management, University of California, Berkeley, 15 pp. Available at: http://shortellresearch.berkeley.edu

Source for background on group and developmental cultures: Shortell, S.M. et al. (1995) Assessing the Impact of Continuous Quality Improvement / Total Quality Management: Concept versus Implementation, *Health Services Research*, *30*(2), 377-401.

Indicator 5: Office Climate

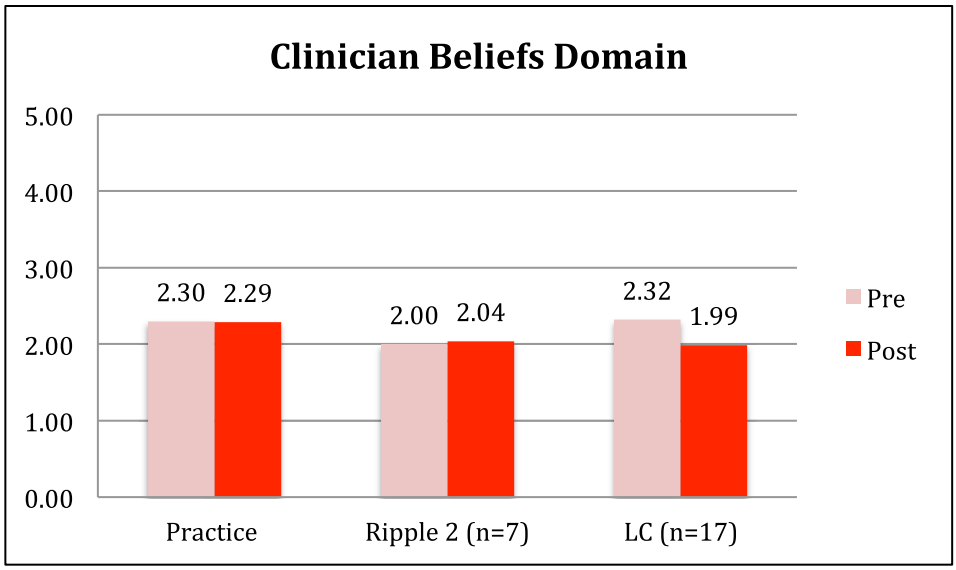
The following ten questions refer to staff's self-reported personal experiences of what it's like working in your practice. For the overall domain, you can compare your practice's total scores "pre" and "post" to that of other BMW-participating practices. You can in turn see which specific items may have changed. The wording is from the clinician version of the Office Inventory; questions 1, 2, 4, 7 and 8 were worded slightly differently for non-clinical staff. Items were rated on a scale of 1 to 10 and converted into a percentage.
The maximum possible score is 100% and minimum is 10%.



		Practice Pre Score (n=21 staff)	Practice Post Score (n=13 staff)
		65%	68%
1	I have the opportunity to make **full use** of my **knowledge** and skills in caring for patients with mental health concerns.	58%	75%
2	I'm **unsure of my role** in caring for patients with behavioral, developmental, or emotional concerns (reverse-coded).	65%	72%
3	My job makes a meaningful contribution and is **important to our practice**.	86%	85%
4	Front-desk and other support staff are **helpful to me** in addressing behavioral, developmental, and emotional concerns of patients.	69%	67%
5	I frequently feel **overwhelmed** by work demands (reverse-coded).	55%	60%
6	I have **autonomy** in making decisions without asking permission from others.	56%	62%
7	I am able to **provide continuity** of mental health care to my patients.	48%	63%
8	I am familiar with and have **trusting relationships** with my patients.	86%	81%
9	It's **difficult** for me to **spend extra time** with patients to address mental health concerns, since there is rarely adequate time in primary care practice (reverse-coded).	61%	53%
10	I am able to **safely express** my ideas, criticism, opinions, and suggestions regarding our practice to co-workers and/or management.	60%	65%

Indicator 6: Clinician Beliefs

The following 14 items relate to clinicians' attitudes and beliefs about psychosocial aspects of care. The purpose of this scale is to gauge how clinical staff feel about patients in relation to behavioral health and their motivation for engaging them. For the overall domain, you can compare your practice's total scores "pre" and "post" to that of other BMW-participating practices. You can in turn see which specific items may have changed. Items were rated on a scale of 1 to 5. Lower scores are better: **The best possible score is 1 and lowest is 5.**



		Practice Pre Score (n=8 staff)	LC Pre Score (n=17 practices)	Practice Post Score (n=7 staff)	LC Post Score (n=17 practices)
		2.30	2.32	2.29	1.99
1	My patients and/or their caregivers do not want me to investigate psychosocial problems.	1.88	2.42	2.17	2.12
2	I cannot help my patients with problems I have not experienced myself.	1.50	1.67	1.57	1.59
3	I focus on organic disease because I cannot treat psychosocial problems.	2.00	1.84	1.83	1.70
4	If I address psychosocial issues patients will reject these issues and never return.	2.13	1.75	1.71	1.61
5	I feel guilty probing the psychosocial concerns of my patients	1.75	1.96	1.86	1.70
6	I don't find satisfaction in treating psychosocial problems in patients in my practice.	2.17	2.13	2.14	2.20

7	I cannot help a patient with a psychosocial problem I have not resolved myself.	2.00	1.70	1.57	1.65
8	The psychosocial problems we all experience do not significantly influence the onset or course of disease.	1.75	1.82	2.33	1.82
9	One reason I do not consider information about psychosocial problems is the limited time I have available.	3.50	2.86	3.00	2.33
10	Evaluating/treating psychosocial problems will cause me to be more overburdened.	2.75	2.64	3.00	2.38
11	So many issues have to be investigated when seeing patients that I do not always consider psychosocial factors.	3.50	2.91	3.33	2.35
12	Investigating issues of psychosocial problems decreases my efficiency.	3.25	2.55	3.29	2.52
13	Patients will become more dependent on me if I raise psychological concerns.	2.25	2.25	2.29	1.82
14	Exploring psychosocial issues with the patient often causes me pain.	1.88	2.17	2.14	2.07

Source for Physician Belief Scale used in Office Inventory: Ashworth, C.D., Williamson, P., and Montano, D. (1984) A Scale to Measure Physician Beliefs About Psychosocial Aspects of Patient Care. *Social Science & Medicine*, *19*(11), 1235-1238. Note: The original wording for Item 6 was "I find great satisfaction…" It was altered for this report so as to facilitate interpretation of the reversed score.

Appendix D: BMW Wave III Implementation Strategies Mapped to Levels and Key Drivers

	Individual Staff Level Skills, attitudes and confidence to support promotion, early identification, and management of mental health concerns	**Organization Level** Culture, climate, structures/processes and technologies that support delivery of mental health services	**Inter-Organization Level** Integrated models of mental health services involving community linkages and decision support
Teaching and intergroup dialogue through online learning community and online modules on quality improvement; preparing the office to support mental health; purposeful parenting; screening and surveillance; developmental disabilities; psychopharmacology; trauma; depression; sleep problems; and substance use			
Lectures, intergroup dialogue, and resource exchange at an all-day Learning Session. Topics include "common factors"; "common elements"; purposeful parenting and preventing toxic stress; screening and surveillance; realizing new office workflows; and integrated models of care			
Dialogue and inquiry to develop "story boards" and "aim statements" to encourage goal-setting			
Lectures, intergroup dialogue, role-plays, evaluation, and feedback at four 2- to 3-hour on-site trainings designed to prepare the office and teach communication ("common factors") and brief intervention practices ("common elements") from mental health care that fit how care is delivered in pediatrics (Brown & Wissow, 2012; Wissow et al., 2008; Wissow et al., 2014)			
Breakthrough Series of Plan, Do, Study, Act cycles (IHI, 2003) facilitated through monthly action period calls and use of an Office Inventory survey to identify action items for improving inner context (American Academy of Pediatrics, 2010; King, 2016a)			
Relationship-building and co-creation of mental health resource directories through community partner receptions and outreach to Pediatric Psychiatry Network for decision support			

Appendix E: Interview Guide for BMW Site Visit Assessment

I. General Feedback on Training

I want to begin by asking you for some general feedback on the on-site training(s). But first, could you tell me a little about your practice? How did your practice become involved in BMW?

Probe: persona or aims shared at the Learning Session

A. Please tell me about your experience with the on-site training(s).

Probes: What did you like about them? What didn't you like about them?
What worked well? What didn't work well?

B. What expectations did you have going into the trainings? How could they have been better met?

Probe: What did you hope to learn? Did you learn the things you thought you needed to know?

C. Overall, did the on-site training(s) seem like a good 'fit' to your organization? Why or why not?

Probes: relative to your patient population and their unique needs, participation level, relative advantage over other ways of learning

II. Information, Motivation, and Behavioral Skills

A. What impact has the training had on your knowledge and skills relating to mental health care? Your comfort level?

Probe: engaging, screening, treating patients (latter two, clinicians only)

B. Thinking back to before BMW, what were attitudes about mental health at your practice like? Have these evolved since the start of the collaborative?

C. In what ways have your own attitudes about mental health care evolved if they have at all?

Probe: engaging, screening, treating patients (latter two, clinicians only)

III. Adoption and Implementation

A. Prior to BMW, to what extent was your practice engaged in mental health care?

B. Thinking back to when you first began applying your learning during the site visit(s), what were the hardest and the easiest parts of getting started?

Probe: Think of one thing you learned that seemed new or that you wanted to remember to try

C. Once you had gotten started, what factors supported your ability to continue applying what you learned? What factors hindered your ability to continue applying what you learned?

Probes: individual, practice, or policy factors?

IV. Organizational Context

I know that a part of the BMW Learning Collaborative, each participant is invited to take part in activities such as Online Modules, Learning Sessions, and PDSA Cycles *in addition* to the on-site trainings. The next few questions pertain to your participation in the Collaborative **as a whole**:

A. Since the start of the Collaborative, what changes has your practice made to its systems, procedures, or technologies for caring for patients?

Probes: staff roles, office procedures, collaboration with other providers,
tools for screening / assessment / outcome monitoring (tools probe clinicians only)

B. In what ways have these systems, procedures or technologies supported you in applying what you learned in the on-site trainings?

Probes: engagement, screening, brief intervention (latter two, clinicians only)

C. Has participation in the Collaborative changed shared expectations for how people at [practice name] provide mental health care? If so, could you give an example? If not, what would this take?

D. How has participation in the Collaborative affected your personal experience of what it's like working at [practice name]?

Probes: stress/chaos, burdens such as caseload and paperwork, comfort in your role,
job autonomy, growth opportunities

E. In what ways might these shared expectations or personal experiences support you in (or hinder you from) using the new skills learned in the on-site trainings?

Probes: engagement, screening, brief intervention (latter two, clinicians only)

V. Sustainability and Remaining Needs

Finally, we are interested in your thoughts on additional resources or activities that would support your practice in caring for children and families with mental health concerns.

A. What is the likelihood that your practice will sustain any progress it has made?

B. What further education or training do you think would help the staff at your practice sustain this progress or keep going? What about that you personally would benefit from?

C. What changes internal or external to your practice would help better support you in providing mental health care to patients?

D. If you could create an on-site training to help practices like yours improve their mental health service capacity, what would the training look like?

Probes: activities, staff involved, scale, marketing/branding, indicators of success

Appendix F: Diagnoses Included in Claims Analysis by Class of Mental Health Condition

Class	ICD-9 Code	Descriptor
Anxiety or depression	292.84	Drug-Induced Mood Disorder
	293.83	Mood disorder in conditions classified elsewhere
	293.84	Anxiety disorder in conditions classified elsewhere
	296.20	Major depressive affective disorder, single episode, unspecified
	296.21	Major depressive affective disorder, single episode, mild
	296.22	Major depressive affective disorder, single episode, moderate
	296.23	Major depressive affective disorder, single episode, severe, without mention of psychotic behavior
	296.24	Major depressive affective disorder, single episode, severe, specified as with psychotic behavior
	296.25	Major depressive affective disorder, single episode, in partial or unspecified remission
	296.26	Major depressive affective disorder, single episode, in full remission
	296.30	Major depressive affective disorder, recurrent episode, unspecified
	296.31	Major depressive affective disorder, recurrent episode, mild
	296.32	Major depressive affective disorder, recurrent episode, moderate
	296.33	Major depressive affective disorder, recurrent episode, severe, without mention of psychotic behavior
	296.34	Major depressive affective disorder, recurrent episode, severe, specified as with psychotic behavior
	296.35	Major depressive affective disorder, recurrent episode, in partial or unspecified remission
	296.36	Major depressive affective disorder, recurrent episode, in full remission
	296.99	Other and unspecified affective psychoses
	300.00	Anxiety state, unspecified
	300.01	Panic disorder without agoraphobia
	300.02	Generalized anxiety disorder
	300.09	Other anxiety states
	300.20	Phobia, unspecified
	300.21	Agoraphobia with panic disorder
	300.22	Agoraphobia without mention of panic attacks
	300.23	Social phobia
	300.29	Other isolated or specific phobias
	300.3	Obsessive-compulsive disorders
	300.4	Dysthymic disorder
	300.80	Somatoform disorders

	300.81	Somatization disorder
	300.9	Unspecified nonpsychotic mental disorder
	301.12	Chronic depressive personality disorder
	308.0	Predominant disturbance of emotions
	308.1	Predominant disturbance of consciousness
	308.2	Predominant psychomotor disturbance
	308.3	Other acute reactions to stress
	308.4	Mixed disorders as reaction to stress
	308.9	Unspecified acute reaction to stress
	309.0	Adjustment disorder with a depressed mood
	309.1	Prolonged depressive reaction
	309.21	Separation anxiety disorder
	309.24	Adjustment disorder with anxiety
	309.28	Adjustment disorder with mixed anxiety and depressed mood
	309.81	Posttraumatic Stress Disorder
	309.9	Unspecified adjustment reaction
	310.89	Other specified nonpsychotic mental disorders following organic brain damage
	310.9	Unspecified nonpsychotic mental disorder following organic brain damage
	311	Depressive disorder, not elsewhere classified
	313.0	Overanxious disorder specific to childhood and adolescence
	313.1	Misery and unhappiness disorder specific to childhood and adolescence
	313.23	Selective mutism
	313.9	Unspecified emotional disturbance of childhood or adolescence
	780.79	Other malaise and fatigue
	799.21	Nervousness
Bipolar disorder	296.00	Bipolar I disorder, single manic episode, unspecified
	296.01	Bipolar I disorder, single manic episode, mild
	296.02	Bipolar I disorder, single manic episode, moderate
	296.03	Bipolar I disorder, single manic episode, severe, without mention of psychotic behavior
	296.04	Bipolar I disorder, single manic episode, severe, specified as with psychotic behavior
	296.05	Bipolar I disorder, single manic episode, in partial or unspecified remission
	296.06	Bipolar I disorder, single manic episode, in full remission
	296.1	Manic disorder recurrent episode
	296.10	Manic affective disorder, recurrent episode, unspecified

	296.11	Manic affective disorder, recurrent episode, mild
	296.12	Manic affective disorder, recurrent episode, moderate
	296.13	Manic affective disorder, recurrent episode, severe, without mention of psychotic behavior
	296.14	Manic affective disorder, recurrent episode, severe, specified as with psychotic behavior
	296.15	Manic affective disorder, recurrent episode, in partial or unspecified remission
	296.16	Manic affective disorder, recurrent episode, in full remission
	296.40	Bipolar I disorder, most recent episode (or current) manic, unspecified
	296.41	Bipolar I disorder, most recent episode (or current) manic, mild
	296.42	Bipolar I disorder, most recent episode (or current) manic, moderate
	296.43	Bipolar I disorder, most recent episode (or current) manic, severe, without mention of psychotic behavior
	296.44	Bipolar I disorder, most recent episode (or current) manic, severe, specified as with psychotic behavior
	296.45	Bipolar I disorder, most recent episode (or current) manic, in partial or unspecified remission
	296.46	Bipolar I disorder, most recent episode (or current) manic, in full remission
	296.5	Bipolar i disorder, most recent episode (or current) depressed
	296.50	Bipolar I disorder, most recent episode (or current) depressed, unspecified
	296.51	Bipolar I disorder, most recent episode (or current) depressed, mild
	296.52	Bipolar I disorder, most recent episode (or current) depressed, moderate
	296.53	Bipolar I disorder, most recent episode (or current) depressed, severe, without mention of psychotic
	296.54	behavior
	296.55	Bipolar I disorder, most recent episode (or current) depressed, severe, specified as with psychotic behavior
	296.56	Bipolar I disorder, most recent episode (or current) depressed, in partial or unspecified remission
	296.6	Bipolar I disorder, most recent episode (or current) depressed, in full remission
	296.60	Bipolar i disorder, most recent episode (or current) mixed
	296.61	Bipolar I disorder, most recent episode (or current) mixed, unspecified
	296.62	Bipolar I disorder, most recent episode (or current) mixed, mild
	296.63	Bipolar I disorder, most recent episode (or current) mixed, moderate
	296.64	Bipolar I disorder, most recent episode (or current) mixed, severe, without mention of psychotic behavior
	296.65	Bipolar I disorder, most recent episode (or current) mixed, severe, specified as with psychotic behavior
	296.66	Bipolar I disorder, most recent episode (or current) mixed, in partial or unspecified remission
	296.7	Bipolar I disorder, most recent episode (or current) mixed, in full remission
	296.8	Bipolar I disorder, most recent episode (or current) unspecified
	296.80	Other and unspecified bipolar disorders
	296.81	Bipolar disorder, unspecified
	296.89	Atypical manic disorder

	296.90	Other bipolar disorders
	298.0	Unspecified episodic mood disorder
		Depressive type psychosis
Disruptive behavior disorder	301.3	Explosive personality disorder
	309.3	Adjustment disorder with disturbance of conduct
	309.4	Adjustment Disorder with Mixed Disturbance of Emotions and Conduct
	312.00	Undersocialized conduct disorder, aggressive type, unspecified
	312.01	Undersocialized conduct disorder, aggressive type, mild
	312.02	Undersocialized conduct disorder, aggressive type, moderate
	312.03	Undersocialized conduct disorder, aggressive type, severe
	312.1	Undersocialized conduct disorder unaggressive type
	312.10	Undersocialized conduct disorder, unaggressive type, unspecified
	312.11	Undersocialized conduct disorder, unaggressive type, mild
	312.12	Undersocialized conduct disorder, unaggressive type, moderate
	312.13	Undersocialized conduct disorder, unaggressive type, severe
	312.2	Socialized conduct disorder
	312.20	Socialized conduct disorder, unspecified
	312.21	Socialized conduct disorder, mild
	312.22	Socialized conduct disorder, moderate
	312.23	Socialized conduct disorder, severe
	312.30	Impulse control disorder
	312.34	Intermittent explosive disorder
	312.4	Mixed disturbance of conduct and emotions
	312.81	Conduct disorder, childhood onset type
	312.82	Conduct disorder, adolescent onset type
	312.89	Other conduct disorder
	312.9	Unspecified disturbance of conduct
	313.81	Oppositional defiant disorder
Autism spectrum disorder	299.00	Autistic disorder, current or active state
	299.01	Autistic disorder, residual state
	299.1	Childhood disintegrative disorder
	299.10	Childhood disintegrative disorder, current or active state
	299.11	Childhood disintegrative disorder, residual state

	299.8	Other specified pervasive developmental disorders
	299.80	Other specified pervasive developmental disorders, current or active state
	299.81	Other specified pervasive developmental disorders, residual state
	299.9	Unspecified pervasive developmental disorder
	299.90	Unspecified pervasive developmental disorder, current or active state
	299.91	Unspecified pervasive developmental disorder, residual
Intellectual disability / developmental delay	315.5	Mixed development disorder
	315.8	Other specified delays in development
	315.9	Unspecified delay in development
	317	Mild intellectual disabilities
	318.0	Moderate intellectual disabilities
	318.1	Severe intellectual disabilities
	318.2	Profound intellectual disabilities
	319	Unspecified intellectual disabilities
	783.42	Delayed milestones
ADHD	314.00	Attention deficit disorder without mention of hyperactivity
	314.01	Attention deficit disorder with hyperactivity
	314.1	Hyperkinesis with developmental delay
	314.2	Hyperkinetic conduct disorder
	314.8	Other specified manifestations of hyperkinetic syndrome
	314.9	Unspecified hyperkinetic syndrome

Appendix G: Summary of Inner Context Scores at Baseline (n=240) and Post-Intervention (n=165) in 20 BMW Practices

	Office Culture (%)		**Office Structure / Processes (%)**		**Office Climate (%)**		**Office Technology (%)**		**IRA ($r_{WG(J)}$)***		**CVF: Blau Index****	**CVF: Prop. Grp/Dev****
	Baseline (n=20)	Post (n=17)	Baseline (n=20)	Post (n=17)	Baseline (n=20)	Post (n=17)	Baseline (n=20)	Post (n=17)	Baseline (n=20)	Post (n=17)	Baseline (n=20)	Baseline (n=20)
1	63.6	84.0	58.0	87.9	68.8	77.2	44.0	85.0	.574	.865	0.62	0.70
2	72.7	86.6	62.0	83.4	60.0	67.1	55.0	76.0	.412	.745	0.55	0.76
3	59.5	78.0	44.0	72.5	61.6	65.0	56.0	73.3	.506	.635	0.70	0.60
4	61.1	78.2	57.6	78.8	55.2	61.8	52.5	90.0	.682	.883	0.65	0.41
5	68.5	78.4	70.5	77.9	65.4	77.1	89.1	83.3	.899	.917	0.68	0.53
6	84.8	75.1	74.2	81.9	76.9	82.5	65.7	88.0	.884	.915	0.67	0.60
7	70.5	82.8	68.9	84.5	66.7	72.1	72.5	80.0	.615	.775	0.66	0.53
8	73.4	78.6	64.9	79.2	62.2	69.5	80.0	85.7	.702	.626	0.67	0.51
9	66.3	87.3	70.1	85.1	70.7	72.8	56.0	85.0	.845	.874	0.62	0.59
10	74.7	90.4	64.0	88.4	69.0	86.8	70.0	88.0	.896	.955	0.66	0.58
11	77.8	N/A	46.7	N/A	74.1	N/A	26.7	N/A	.878	N/A	0.48	0.83
12	83.1	86.3	72.6	87.3	73.3	77.8	72.0	100	.940	.958	0.63	0.62
13	67.3	75.2	62.2	73.4	66.1	71.0	62.8	80.0	.850	.889	0.66	0.65
14	65.4	72.8	64.6	71.8	60.6	64.9	56.0	82.8	.666	.695	0.69	0.53
15	70.9	N/A	61.5	N/A	72.2	N/A	45.0	N/A	.794	N/A	0.59	0.71
16	51.4	63.3	53.4	71.3	57.6	60.4	30.0	60.0	.878	.802	0.61	0.52
17	79.0	N/A	81.5	N/A	82.2	N/A	86.7	N/A	.050	N/A	0.69	0.43
18	65.0	67.4	66.4	71.8	60.9	62.2	75.7	84.4	.896	.768	0.61	0.54
19	46.9	76.5	42.9	77.6	57.5	77.4	30.0	80.0	.204	.901	0.59	0.55
21	85.8	93.7	76.6	92.2	67.3	63.3	92.0	95.0	.583	.915	0.74	0.56
LC Mean	69.4	79.7	63.1	80.3	66.4	71.1	60.9	83.3	.688	.830		

* For each practice at baseline, inter-rater agreement (IRA) for each domain was calculated using the $r_{WG(J)}$ index. It ranges in value from 0.00 (no agreement) to 1.00 (perfect agreement). Average IRA across domains was in turn calculated for each practice.

** All staff rated their practice culture using competing values framework (CVF). Uniformity of distribution of points across the four values ("Blau Index") and proportion of points assigned to developmental and group types ("Prop. Grp/Dev") were calculated for each respondent. Practice scores represent the average across individual respondent scores for each practice.

Appendix H: Descriptive Statistics of Intervention Outcome Variables at Baseline and Post-Intervention

Variable	Fixed Effects Coefficients (95% CI)		Random Effects Coefficients				ICC(1)	
			Practice Variance		Residual Variance			
	Baseline (n=223) †	Post (n=165) †	Baseline	Post	Baseline	Post	Baseline	Post
Culture (%)	67.7 (63.1 to 72.3)	79.0 (75.7 to 82.4)	7.69**	4.28	19.4	17.1	.136	.059
Structures/processes (%)	63.1 (58.9 to 67.3)	79.5 (76.6 to 82.4)	6.62**	3.06	20.3	16.5	.096	.033
Climate (%)	64.5 (62.0, 67.1)	70.9 (67.5, 75.2)	2.72	4.61	15.4	15.2	.030	.084
Technologies (%)	63.2 (55.0, 71.5)	84.1 (79.6, 88.6)	11.6*	~ 0	32.1	22.0	.116	~ 0
	Baseline (n=96)	Post (n=74)	Baseline	Post	Baseline	Post	Baseline	Post
Belief/Feelings	15.6 (14.4, 16.9)	14.2 (13.0, 15.5)	.743	~ 0	5.82	5.29	.016	~ 0
Burden	15.4 (14.0, 16.7)	13.4 (12.1, 14.5)	1.65	1.00	5.30	5.08	.088	.037
PBS Total	30.9 (29.0, 32.9)	27.7 (25.6, 29.8)	~ 0	~ 0	9.62	9.36	~ 0	~ 0
	Baseline (n=65)	Post (n=52)	Baseline	Post	Baseline	Post	Baseline	Post
Confidence	2.92 (2.75, 3.10)	3.55 (3.45, 3.65)	.275	~ 0	.410	.372	.309	~ 0

*** p<.001, ** p<.01, *p<.05

† Inner context domain scores are reported only for the 17 practices participating in the Office Inventory at both baseline and post. They are calculated at the staff/clinician level, using linear mixed-effects models to account for clustering by practice. Averages thus differ slightly from those reported in Appendix G.

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Wissow, L. S., Tegegn, T., Asheber, K., McNabb, M., Weldegebreal, T., Jerene, D., & Ruff, A. (2014). Collaboratively reframing mental health for integration of HIV care in Ethiopia. *Health Policy and Planning*, 1–13.

Wissow, L. S., Zafar, W., Fothergill, K., Ruble, A., & Slade, E. (2016). Using vignettes to assess contributions to the work of addressing child mental health problems in primary care. *BMC Health Services Research*, *15*(1), 584.

World Health Organization, & World Organization of Family Doctors (Wonca). (2008). *Integrating Mental Health into Primary Care: A Global Perspective*. Geneva, Switzerland: WHO Press. Retrieved June 12, 2013, from http://www.who.int/mental_health/policy/services/en/index.html

CURRICULUM VITAE

MELISSA A. KING

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Los Angeles, CA 90065

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EDUCATION

Expected 2016 — **Doctor of Philosophy**
Johns Hopkins Bloomberg School of Public Health, Baltimore, MD
Department of Health, Behavior & Society
Dissertation: *The Role of Organizational Context in the Implementation of Mental Health Services in Pediatric Primary Care: Concepts, Mechanisms, and Intervention*
Committee: Lawrence Wissow, Jill Marsteller, Olakunle Alonge, Jill Owczarzak

2009 — **Master of Public Affairs**
Certificate in Social and Economic Policy
Lyndon B. Johnson School of Public Affairs, University of Texas at Austin
Thesis: *NGOs and the Role of Civic Engagement in Promoting Efficient HIV/AIDS Programming in Rural Africa*
Committee: Patrick Wong, Cynthia Buckley, Jacqueline Angel

2002 — **Bachelor of Arts** in Biology
Boston University, Boston, MA
College of Arts and Sciences

Bachelor of Science in Journalism
Boston University, Boston, MA
College of Communication

RESEARCH INTERESTS

My research spans three domains: (a) development and evaluation of interventions to promote child and adolescent health through mental health and primary care integration; (b) examining "organizational context" as a theoretical construct and target of health service interventions; and (c) implementation science. Areas of expertise include community mental health; health behavior change; mixed-method research design; social inequalities in health; health policy; health communication; and organizational behavior and theory.

PROFESSIONAL EXPERIENCE

PUBLIC HEALTH RESEARCH ASSISTANT — 2013 – Present
Center for Mental Health Services in Pediatric Primary Care, Baltimore, MD

- Center's lead investigator for Ohio Building Mental Wellness, an AAP initiative to integrate mental health into primary care. Plan and conduct mixed-methods research; design theory-based tools; provide actionable feedback to faculty and participants; present findings and moderate dialogue to inform future interventions
- Co-investigator on Dr. Jacquelyn Campbell's African American and Afro-Caribbean Women's Study, undertaking claims analysis, cost-of-illness analysis, and propensity score matching to estimate the health care use and costs associated with intimate partner violence among case-control study participants

HEALTH POLICY ANALYST — 2009 – 2013
Massachusetts Behavioral Health Partnership, Boston, MA

- Provided leadership and policy expertise in the monitoring and evaluation of the Children's Behavioral Health Initiative (CBHI) for organization that manages health services for 350,000+ MassHealth members
- **Authored first outcomes studies of the CBHI, including cohort studies of its effects on health care cost and utilization and analyses of its impact on a child/youth's likelihood of inpatient readmission**

- Completed research studies on new evidence-based practices and workforce development in community mental health using mixed methods including surveys, focus groups, and site visits
- **Successfully implemented Massachusetts' first statewide Wraparound Fidelity Assessment System in collaboration with University of Washington**. Gathered and analyzed data on fidelity to this model of care coordination, generating customized reports for practices and presenting findings at statewide meetings
- Wrote several sections of the organization's winning bid submitted in response to the Commonwealth's Request For Response for a vendor to manage the behavioral health services of the MassHealth PCC Plan
- Developed framework for OBH to link data from disparate sources to monitor trends in behavioral health service use and wrote plan and content for a **real-time quality indicator dashboard for service providers**

INSTITUTE FOR HEALTH AND SOCIAL JUSTICE GRADUATE INTERN 2008 – 2009
Partners In Health, Boston, MA

- Produced booklets and articles on policy topics ranging from drug-resistant TB to poverty and health system strengthening. Drafted and printed **deliverables for 2008 International HIV/AIDS Conference**
- Developed and wrote funding proposals for the women's health program *Proje Santé Fanm* in Haiti, soliciting **general operating funds** from the **Global Fund for Women** and **Samuel Rubin Foundation**

EDITOR, HEALTH POLICY BULLETIN 2007 – 2008
Center for American Progress, Washington, DC

- Collaborated with 18 writers to conceptualize, design and produce the biweekly Health Policy Bulletin on health care reform, published by CAP's Domestic & Economy team. **Selected by CAP to serve as editor**

PUBLIC HEALTH RESEARCH ASSISTANT 2007 – 2008
St. David's Community Health Foundation, Austin, TX

- Conducted community needs assessments in areas such as children's health and HIV/AIDS for non-profit that provides health care, education and support to thousands of underserved families in Central Texas
- Led interviews with directors and development teams of area non-profits and submitted a report to the St. David's Board of Directors on how the grant-making process could be improved. **Suggestions were incorporated into Foundation's strategic plan for the disbursement of $64M in grants in FY2009**

MARKETING MANAGER 2005 – 2007
Lahey Health System, Burlington, MA

- Established health system's first professional in-house marketing agency and managed production and placement of newspaper, magazine, radio and TV advertising. **Responsible for oversight of $1.4M budget**
- Supervised and coordinated assignments for marketing specialists, staff writers and creative design team
- Monitored trends and developed and executed marketing plans, communications and events for strategic services. **Credited with improvements in public awareness/preference made in five major service lines**

PUBLICATIONS SPECIALIST 2002 – 2004
Lahey Health System, Burlington, MA

- Assistant Editor of Lahey's *Advances in Health Care and Medicine* magazine and *Health and Wellness News* patient newsletter and Senior Editor of the bi-weekly hospital newsletter, *Spectrum*. Wrote copy for web site, advertisements, brochures and direct mail pieces, and assisted with media relations

MEDICAL NEWS INTERN 2002
WCVB-TV, Needham, MA

- Investigated and reported on advances in health care and medicine for this ABC News affiliate's HealthBeat team. Monitored advances in scientific journals and wrote scripts for daily HealthBeat reports

PROFESSIONAL ACTIVITIES

Member in good standing of the **American Public Health Association**, **Academy of Management**, and **National Coalition for Dialogue and Deliberation**. Committed to promoting mental health as part of whole health and creating equitable access to health care as member of the **National Alliance on Mental Illness**.

Past professional memberships and activities have included:

2009 – 2012	MA EOHHS *Health Disparities Reduction & Elimination Committee*
2009 – 2012	MA EOHHS *Data, Trends and Outcomes Committee*
2007 – 2009	Chair of LBJ School of Public Affairs *Social, Health, and Economic Policymakers*
2006 – 2007	Member of Arthritis Foundation, MA Chapter, *Public Health Advisory Board*
2000	*Elected Student President* of Boston University College of Arts and Sciences

AWARDS AND HONORS

2015	Organizational Behavior Doctoral Consortium Participant, Academy of Management
2012 – 2016	Ph.D. Program Scholarship, Health, Behavior & Society, Johns Hopkins University
2012	Employee Performance Award, Massachusetts Behavioral Health Partnership
2009	Emmette Redford Award for Outstanding Research, LBJ School of Public Affairs
2009	Wilbur and Eloise Cohen Award for Outstanding Research in Health and Social Policy Center for Health and Social Policy, University of Texas at Austin
2008	Barbara Jordan Fellowship for Graduate Internship, Partners In Health
2007 – 2009	Master's Program Fellowship, LBJ School of Public Affairs, UT Austin
2004	New England Society for Health Care Communications Conference Scholarship
2003, 2004, 2005	New England Society for Health Care Communications Lamplighter Award
2003	Lahey Global Outreach Grant to live and work in HIV/AIDS orphanage in Ethiopia

PRACTICE ACTIVITIES

As a seasoned public health practitioner and policy professional who has worked in a variety of underserved settings, I have a personal commitment to public service and volunteerism. Alongside my professional work on statewide initiatives in Ohio (BMW) and Massachusetts (CBHI), I have remained actively involved in the implementation and evaluation of programs in my community. These projects reflect my dedication to issues of community mental health and social justice and interest in trialing novel approaches to program evaluation and the practice of civic engagement, including dialogue and deliberation and mindfulness techniques.

MBSR Program and CLEAR Campaign (2013-2014)

Jon Kabat-Zinn's mindfulness-based stress reduction (MBSR) program is a structured intervention shown to enhance mindfulness – or non-judgmental awareness of present-moment experience – which clinical trials have shown to confer benefits including improved coping and psychological functioning and reduced stress. I was co-investigator (Sibinga PI) of a mixed-method study to explore the effects of the MBSR program on undergraduate students as part of the Johns Hopkins Provost Office's effort to reduce stress and its negative effects. The program included nine weekly 2-3 hour group sessions featuring didactic material, practice of mindfulness techniques, and discussion focused on barriers/facilitators and development of home practice. Research methods included semi-structured in-depth interviews and self-report measures of perceived stress, coping, emotional states, and mindfulness pre- and post-intervention. Recruitment materials were developed by myself and colleagues through CLEAR, a separate health communication campaign designed to promote MBSR among graduate students. Informed by health behavior change theory, our campaign featured targeted communication materials and events designed to confer the information, motivation, and skills to practice.

Program Evaluation: Veterans Re-Entry Transitional Housing Program (2009)

Community Partnership for the Homeless operates a transitional housing program for homeless veterans and provides affordable housing units for low-income families in Central Texas. I and colleague Susannah Hansen conducted a voluntary evaluation of the "Green Doors" Veterans Re-Entry Transitional Housing Program, which provides housing and social services to support veterans seeking to achieve self-sufficiency. Methods included in-depth interviews with program staff and residents; benchmarking interviews with executives of other transitional housing programs; ethnographic observation of program activities; neighborhood walkabouts; and two literature reviews. Actionable recommendations included suggestions for expanding stakeholder engagement; increasing resident participation; partnering with the VA to offer a career re-entry program; monitoring program effectiveness; and initiating a shift in the housing model.

ECHO Community Forum on Homelessness: 'The Vision' (2008)

The Ending Community Homelessness (ECHO) Coalition forum was the culminating event of 2008 National Hunger and Homelessness Awareness week in Austin, Texas. The forum involved a social technology known as a Future Search, whereby stakeholders work together to foster a shared vision and to identify actionable steps for achieving this end. As the lead organizer and moderator, I developed facilitation guides and recruited and trained skilled mediators to lead participants in a series of visioning sessions designed to elicit diverse insights on how to move from "coping" with homelessness to lasting solutions. Solutions that emerged over the course of the weekend were incorporated into the City's 10-year strategic plan. Patricia Wilson and Oliver Markley of UT Austin's Center for Integral Living and the National Coalition for Dialogue and Deliberation provided expert guidance and mentoring in these civic engagement techniques.

Program Evaluation: Jack Sansing Dental Clinic (2007)

Jack Sansing Dental Clinic provides care on a sliding-scale basis to more than 1,200 HIV-positive individuals from ten Central Texas counties. I conducted a voluntary program evaluation using methods including ethnographic observation of organizational activities and in-depth interviews with program staff. Actionable recommendations relating to shifts in organizational context; metrics to measure efficiency; health communication materials; and educating the public, grantees and private donors about the importance of oral health for individuals with HIV/AIDS were delivered in a report to the founder and clinical director.

ORIGINAL RESEARCH AND PUBLICATIONS

Peer-Reviewed Journal Articles in Preparation

King, M. Care in Context: An Inventory to Assess Organizational Readiness for Mental Health Service Implementation in Pediatric Primary Care

King, M. and Wissow, L. *'We're trying to bridge the gap':* Narratives of Organization Change in a Statewide Initiative to Integrate Mental Health and Pediatric Primary Care

King, M., Baum, B., Wissow, L., Maciejewski, H., Jaworski, C., O'Hanlon, S., and Duby, J. Ohio Building Mental Wellness: Implementation, Service, and Client Outcomes of a Statewide Intervention to Implement Mental Health Services in Pediatric Primary Care

King, M. and Wissow, L. The Role of Organizational Context in the Implementation of a Statewide Initiative to Integrate Mental Health Services in Pediatric Primary Care

King, M. Weeks, K., Hsu, Y.J., Chang, B., and Cunningham, B. Defining and Measuring Organizational Context in Health Care Services: A Systematic Review

Kerrigan, D., Chau V., Holman, E., **King, M**., Joffee, A., and Sibinga, E. The role of a Mindfulness-Based Stress Reduction (MBSR) program in reducing stress and promoting health and wellbeing among university students at a highly ranked university in the United States

White Papers and Policy Briefs

King, MA. (2013). *The Affect of Intensive Care Coordination and In-Home Therapy on Inpatient Service Use among Children/Youth in MA*. Cohort study completed as consulting project for MBHP, Boston, MA.

King, MA. (2012). *Impact of Service Integration for DMH Clients with Diabetes on HRQoL: A P4P Outcomes Strategy*. White paper completed as consulting project for MBHP, Boston, MA.

King, MA. (2012, 2010). *Massachusetts Wraparound Fidelity Assessment System: Statewide Fidelity Data Summary*. MBHP, Boston, MA. Policy brief submitted and presented to MA EOHHS.

King, MA. (2011). *Impact of CBHI-Related Services on Inpatient Service Use among MBHP Members*. MBHP, Boston, MA. Policy brief submitted and presented to MA EOHHS.

King, MA. (2011). *Interim Analysis of the Role of Intensive Care Coordination in Reducing Costs and Improving Behavioral Health Outcomes of At-Risk Youth*. MBHP, Boston, MA. Policy brief submitted and presented to MA EOHHS.

Battaglia, G.…**King, MA**. (2011). *Develop a Strategic Plan that Expands the Use of Effective Treatments in Outpatient Behavioral Health Services and that Links Effective Treatments to Care Integration and Principles of Recovery and Rehabilitation*. MBHP, Boston, MA. Performance incentive project submitted by our research team to MA EOHHS.

Stelk, W….**King, MA.** (2010). *Improve and Standardize the Skill-Set Among Behavioral Health Care Coordination Paraprofessionals through Focused Assessment and Training and Make Recommendations for the Continuing Development of the Behavioral Health Paraprofessional Workforce*. MBHP, Boston, MA. Performance incentive project submitted by our research team to MA EOHHS.

TEACHING

Co-Instructor and curriculum developer, *Integrating Children's Mental Health and Primary Care: A Social and Behavioral Science Perspective*, Johns Hopkins University Bloomberg School of Public Health, Department of Health, Behavior and Society, Baltimore, MD, Winter Institute, 2015

Teaching Assistant and Lecturer, *Implementation Research and Practice*, Johns Hopkins University Bloomberg School of Public Health, Department of Health Policy and Management, Department of International Health, and Department of Health, Behavior & Society, Baltimore, MD, Second Term, 2014

Teaching Assistant and Lecturer, *Integrating Social and Behavioral Theory into Public Health Programs*, Johns Hopkins University Bloomberg School of Public Health, Department of Health, Behavior & Society, Baltimore, MD, First Term, 2013

Graduate Teaching Assistant, *Introduction to Quantitative Analysis*, LBJ School of Public Affairs, University of Texas at Austin, Austin, TX, Fall Semester, 2008

Undergraduate Teaching Assistant, *Introduction to Biology*, College of Arts and Sciences, Boston University, Fall Semester, 1999

PRESENTATIONS AND CONFERENCES

King, MA. (2014). *Health Care Use and Costs Associated with Intimate Partner Violence among African American Women in Baltimore, MD*. Presentation of cost-of-illness analysis undertaken as staff member of Jacquelyn Campbell's *Afro-Caribbean and African-American Women's Study* to Center for Mental Health Services in Pediatric Primary Care, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD

King, MA. (2012). *Putting Children's Behavioral Health on the Map: Supporting the CBHI through Geographic Communication*. Animated presentation developed as final project for Harvard University GIS course using EOHHS and MCE data and presented to MA Behavioral Health Partnership, Boston, MA

King, MA., Goodman, M. (2011). *Massachusetts Wraparound Fidelity Assessment System: Promoting Positive Outcomes through Fidelity Monitoring*. Second annual presentation to MA EOHHS, managed care entities, and mental health care providers at statewide meeting in Worcester, MA.

King, MA. (2010). *Massachusetts Wraparound Fidelity Assessment System: Promoting Positive Outcomes through Fidelity Monitoring*. First annual presentation to MA EOHHS, managed care entities, and mental health care providers at statewide meeting in Worcester, MA.

King, MA., Shannon, M., Veron, R. (2009). *From Entitlement to Empowerment: The Role of Social Capital in Improving U.S. Anti-Poverty Programs*. Conference paper and workshop presented at Baylor University Poverty Summit, Waco, TX.